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FACT BOOK OF U.S. AGRICULTURE

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PREFACE

The contents of the Fact Book of U.S. Agriculture are organized to reflect the structure of modern agriculture and provide pertinent information on its history, especially as it pertains to statistics gathered this century. The major subdivisions are the following:

I. FARM PRODUCTION, INCOME, AND VALUES deals with farm production goods, the industries and service organizations that produce the goods and services that farmers buy to produce food and fiber, farmers' credit arrangements, farm income, and financial values.

II. THE FARMING OPERATION covers the farm business itself with its combinations of land, labor, management, and capital to produce farm products.

III. INTERNATIONAL AGRICULTURAL TRADE AND AID gives a brief picture of trade as it affects U.S. farmers and the balance of international payments, and also touches on the international distribution of U.S. food through commercial and charity channels with which USDA personnel work. International technical assistance, training, research, and scientific cooperation efforts are discussed in terms of benefits to both recipient nations and the United States.

IV. FOOD MARKETING, PROTECTION, AND DISTRIBUTION describes the competitive system that converts farm products into safe consumer products ready for use commercially and for use as charity in homes, restaurants, and institutions, including local social welfare organizations and groups of Indians and Alaska Natives. The system handles the products from farmer to consumer, as well as consumer education, advertising, and other elements of marketing.

V. FARM PRODUCTION AND MARKETING PROGRAMS deals with activities of the U.S. Department of Agriculture and other Government and private agencies that support and regulate modern agriculture in order to maintain the strong family farm system as much as possible.

VI. CONSERVATION: SOIL, WATER, TREES tells of some of the conservation problems facing U.S. agriculture and how Government agencies try to help farmers solve those problems.

VII. AGRICULTURAL PLANNING, PRODUCTIVITY, AND PROTECTION SERVICES describes activities of various USDA agencies that support modern agriculture: research, inspection, crop and livestock protection, Cooperative Extension, statistics, regulatory activities, grading services, and economic studies. New chapters deal with animal care (65) and animal damage control (66).

VIII. THE RURAL SOCIAL ENVIRONMENT pertains to the population, environment, and social problems of smaller towns, and the open country.

THE FACT BOOK OF U.S. AGRICULTURE is intended as a handy source of information for reporters; editorial writers; farm organization leaders; agribusiness managers; students; and others who study, speak, and write about agriculture.

More detailed tabulations and charts will be found in AGRICULTURAL STATISTICS and the AGRICULTURAL CHARTBOOK, both revised yearly. AGRICULTURAL STATISTICS is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Single copies of the AGRICULTURAL CHARTBOOK are free on request. Other selected references are listed on page 163.

THE FACT BOOK OF U.S. AGRICULTURE is a publication of the Office of Public Affairs, U.S. Department of Agriculture, Washington, DC 20250.

—George B. Holcomb, Editor

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INTRODUCTION

THE NATION'S AGRICULTURAL INDUSTRY

Agriculture is the Nation's biggest industry. Farm assets totaled $709 billion on December 31, 1987. And the Nation's food and fiber system accounted for 16.6 percent of the total gross national product in 1986.

Agriculture is also the Nation's largest employer. About 21 million people work in some phase of agriculture—from growing food and fiber to selling it at the supermarket. Farming itself employs roughly 2.1 million workers, as many as the combined work forces of transportation, the steel industry, and the automobile industry.

The Nation's agricultural production is conducted by 2.18 million farms.

Recent tabulations show that in 1987:

- 1,350,000 farms (63.5 percent of all farms) sold less than $19,999 worth of farm products per farm.
- 209,000 (9.6 percent) sold farm products worth $20,000 to $39,999.
- 286,000 (13.2 percent) sold farm products worth $40,000 to $99,999.
- 301,000 (13.8 percent) sold farm products worth more than $100,000. Of these farms, 201,000 had sales totaling $100,000 to $249,999; 71,000 had sales of $250,000 to $499,999; and 29,000 had sales of $500,000 and over.

Agriculture requires the services of about 18.9 million people to store, transport, process, and merchandise the output of the Nation's farms.

Here are a few examples of where these people work:

- Meat and poultry industry, including meatpacking, prepared meats, and poultry dressing plants, employs about 372,000 people, and has a payroll of $4.7 billion.
- Dairy industry, including manufacturers of such products as fluid milk, concentrated and dried milk, cheese, butter, and ice cream, employs nearly 163,000 people, and has a payroll of $1.9 billion.
- Baking industry, including plants for making bread, biscuits, and crackers, employs over 210,000 people and has a payroll of $2.6 billion.
- Canned, cured, and frozen food plants employ nearly 238,000 people and have payrolls of $3.2 billion.
- Cotton mills and finishing plants employ nearly 102,000 people and have payrolls of $1.4 billion.

That adds up to approximately 17 percent of all jobs in private enterprise.

AGRICULTURE GETS FOOD TO PEOPLE WHERE THEY WANT IT

The U.S. farmer is linked to the people by a complex food marketing system. In 1987, consumers spent $377 billion for U.S. farm-produced foods. About $283 billion of that was to get the food from the farm to tables of U.S. residents. The food—roughly 350 million tons of it—was assembled, inspected, graded, stored, processed, packaged, wholesaled, and retailed. To reach people, this food traveled across 173,800 miles of railroads, 3.4 million miles of highways, and 26,000 miles of improved waterways.

The foods that poured into supermarkets came in 10,000 to 15,000 different products, many of which did not even exist 5 years ago and may very well not exist 5 years from now. That's because Americans are attracted to newer foods with more built-in conveniences, as well as to food in attractive packages that preserve the quality.

Packaging and transportation cost $47 billion in 1987, and might well have cost considerably more except for vigorous competition among truckers and railroads, and recent innovations in packaging and handling methods. The food marketing system has developed a computerized checkout, and is working on an inventory and ordering system that might further streamline food retailing and help to simplify shopping.

FARMERS ARE EFFICIENT PRODUCERS

In 1986, U.S. farmers produced over 40 percent more crop output on an acre of land than they did in 1966. One hour of farm labor produced 7.8 times as much food and other crops in 1986 as it did in 1947.

In 1986, one farmworker supplied enough food and fiber for 93 people. Only 10 years before, the farmworker was producing enough for 58. Because of the farmer's efficient output, U.S. residents can enjoy a satisfying quantity and variety of food.

In 1986, for example, each U.S. resident consumed an average of 142 pounds of beef, veal, pork, lamb, and mutton; 72 pounds of chicken and turkey; 88 pounds of fresh fruits; 79 pounds of fresh vegetables; 290 pounds of dairy products; and 50 pounds of fresh potatoes.

Farmers produce not only enough for everyone, but also enough to make large quantities of farm products available for international trade.

The United States exports more farm products than any other country in the world.

In 1987, production from one-third (107 million acres) of America's cropland went overseas.

From 1971 through 1981, farm exports set successive records, reaching a peak of $43.8 billion in fiscal year 1981. However, because of the higher exchange rate, greater competition, and reduced foreign demand, exports began a steady decline and by fiscal 1987 fell to $27.9 billion. Preliminary figures for final 1988 showed a 22-percent increase.

Farm exports contributed a net of $7.3 billion in fiscal year 1987, and an expected $13.5 billion in fiscal 1988.

RISING AGRICULTURAL PRODUCTIVITY

Total agricultural production is more than 2-1/2 times the level of 1930, even though the agricultural resource base has not substantially changed. The growth in farm output has come from the higher productivity of agricultural resources rather than from greater input use.

Total inputs to agriculture in 1986 were 6 percent lower than in 1930. Yet in 1986, crop production was 2.4 times the 1930 level, livestock production 2.2 times the 1930 level, and total farm output about 2.6 times the 1930 level. This implies that the productivity of land is more than 2-1/2 times the productivity in 1930, that breeding animals are 2-1/3 times as productive as in 1930, and that overall the farm sector is 2.8 times as productive.

The new technology which made these gains possible changed the mix of other inputs used. Fertilizer consumption in 1986 was 11.4 times higher than 1930 levels; feed, seed, and livestock purchases 3.7 times; tractor horsepower 12.4 times; and tractor numbers 5.1 times the 1930 number.

On balance, purchased inputs in 1986 were 2.2 times those of 1930, while the farm labor input was only 26 percent of farm employment in 1930. As a result, farms have expanded in size and become more dependent on capital and purchases from the nonfarm economy.

If the trends of the last 15 years continue, total farm output per unit of input should grow 2.3 percent per year, crop production per acre should increase 1.4 percent per year, and livestock production per breeding unit should increase 1.6 percent per year. Significant changes in the prices of farm inputs relative to farm commodity prices, or changes in the mix of commodities produced, will affect the actual trends that occur.

FARMERS ARE CONSUMERS AS WELL AS PRODUCERS

Like everyone else, the U.S. farmer is a consumer and a taxpayer, as well as a producer.

Farmers pay about $3.7 billion in farm real estate taxes annually, and $474 million in personal property taxes.

In 1986, farm operators spent about $122 billion for goods and services to produce crops and livestock. They had available $37.5 billion in personal income from production activities and government payments and $44.7 billion from nonfarm sources to spend for personal taxes, debt reduction, investments, and some of the same things that city people buy.

Farmers' 1986 purchases included the following:

- $6.4 billion for farm tractors and other motor vehicles, machinery, and equipment;
- $9.5 billion for fuel, lubricants, and maintenance for machinery and motor vehicles used in the farm business;
- $19 billion for feed and seed;
- $5.8 billion for fertilizer and lime.

Like everyone else, farmers feel the pinch of inflation. In the last 10 years, wage rates for farmworkers have gone up 72 percent, tractors and self-propelled machinery cost 91 percent more, taxes are up 43 percent, and feeder livestock prices are up 58 percent.

Overall, the average cost of commodities, interest, taxes, and farm wage rates has climbed 72 percent in the last 10 years. These increases on the average include the much lower rates of inflation experienced in the past few years.

PEOPLE GET MORE FOOD FOR THEIR MONEY

Not only have food prices risen comparatively little in the past few years, but family income buys considerably more food today partly because agriculture has become much more efficient and partly because consumer incomes have risen faster than food prices. For example, here's what the average worker could buy with an hour's pay in 1950 and in 1987.

Table 1. The amount of food a worker's hourly pay would buy

Food item	1950	1987
White bread	10.1 lbs	16.4 lbs.
Frying chickens	2.5 lbs.	11.4 lbs.
Milk	8.0 qts.	7.9 half gals.
Fresh potatoes	29.0 lbs.	32.5 lbs.
Eggs	2.4 doz.	11.5 doz.
Pork	2.7 lbs.	4.8 lbs.

People's diets have become more varied. They are eating 47 percent more poultry but 20 percent less beef per person than they did 10 years ago. They eat more fresh vegetables (13 percent) and more fresh fruits (23 percent).

WHAT THE FARMER RECEIVES (1987 ANNUAL AVERAGE)*

As gross payment from retail food prices, U.S. farmers receive:

- 30 cents per $1 spent in grocery stores for U.S. farm-grown food.
- 57 cents per $1 spent for choice beef.
- 48 cents for eggs selling for 78 cents per dozen at retail.
- 3.3 cents for the wheat in a 55-cent loaf of white bread.
- About 56 cents for a $1.14 half-gallon of milk.

For their labor, capital, and management of the farms, farmers received:

- $138.1 billion in cash receipts, or gross sales of crops and livestock, or about $63,459 per farm. Their net farm income or return for farm resources was $46.3 billion.

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*Preliminary

I. FARM PRODUCTION, INCOME, AND VALUES

1. INPUTS FOR AGRICULTURE

The three basic "inputs" for agricultural production are land, labor, and capital.

Land is no longer the major production tool. The productivity of the land now depends on the skill and knowledge with which capital is applied: the use of mechanical power and machinery, fertilizer, lime, better seed, pest control chemicals, and the technology applied to conserve and enhance the land while in productive use.

The total volume of all resources in agriculture—land, labor, machinery, and supplies—has changed little since 1955.

The composition of inputs, however, has changed drastically as farmers have struggled to become more productive and more efficient. Farm labor inputs have declined rapidly; farm real estate has remained relatively constant. All other inputs, chiefly purchased, have increased rapidly. Purchased inputs are about one-third greater than in 1955; nonpurchased inputs have declined more than two-thirds.

2. LAND

More than half of the 2.3 billion-acre land area of the United States is used to produce crops and livestock. The rest is distributed among forest land (25 percent); urban, transportation, and other uses (12 percent); and unused lands.

Our cropland resources in 1982, according to the Soil Conservation Service (SCS) National Resources Inventory, consisted of 421 million acres, of which 376 million acres are cultivated for crops, 38 million acres are used for hay, and 7 million acres are in horticultural uses. About 55 percent of these areas is prime farmland, which is the best land for producing food and fiber.

The Nation has nearly 1.1 billion acres of non-Federal rural land currently being used for pasture, range, forest, and other purposes. About 153 million acres are suitable for conversion to cropland if needed. Of this, 35 million acres have a high potential for conversion to cropland, and 118 million acres have a medium potential. The remaining rural land has little or no potential for conversion to cropland.

This means that the cropland reserve is limited to about 14 percent of the remaining non-Federal land. Most of this land would require careful soil and water management if brought into intensive agricultural use, and doing so would further diminish our supply of pasture, range, or forest land.

Table 2.—U.S. land ownership and use in 1982, excluding Alaska

Data provided by Soil Conservation Service, U.S. Department of Agriculture

Type of land	Hectares (millions)	Acres (millions)	Percentage of total
Federal land	163	404	21
Non-Federal land	606	1,498	79
Total land area	769	1,902	100

Figures do not include Alaska

Table 3.—Non-Federal use of land in the United States, excluding Alaska, in 1982

Data provided by Soil Conservation Service, U.S. Department of Agriculture

Type of land	Hectares (millions)	Acres (millions)	Percentage of total
Cropland	170	421	28
Pastured land	54	133	9
Rangeland	164	406	27
Forest land	159	394	26
Small water areas	4	10	1
Urban, built-up, and transportation areas less than 10 acres in size	30	74	5
Other land	24	60	4
Total land area	605	[1]1,498	100

[1] Does not include 14 million acres of non-Federal land in Alaska.

3. WATER

U.S. precipitation varies from nearly none in the Death Valley desert in California to more than 100 inches per year in some areas—for example, the Olympic Mountains in Washington. The average for the 48 mainland States is 30 inches per year—a total of 1,570 trillion gallons. This total does not change much from year to year, but precipitation at any location may vary greatly.

Two-thirds of this water evaporates from wet surfaces or soaks into the soil to sustain crops, pastures, rangeland, and forests. The other third percolates deep into the ground or finds its way into streams. Water in the streams can be used for navigation, recreation, or power generation. It also can be diverted from streams and (with water pumped from underground) used for irrigation, industry, and other purposes.

In 1982, 49 million acres of land were irrigated in the 50 States, a decrease from the 50.3 million peak of 1978. Most of the acreage increase in irrigated land since 1964 occurred in the 17 Western States and Louisiana. The greatest percentage increase since 1964 occurred in the 31 Eastern States, Alaska, and Hawaii.

Table 4.—Specified U.S. crops harvested by acres irrigated in 1982

Crop	Irrigated acreage[1] (1,000 acres)
Corn	9,532
Hay	8,507
Cotton	3,423
Land in orchards	3,347
Wheat	4,650
Rice	3,233
All vegetables harvested for sale	2,029
Sorghums for grain or seed	2,186
Barley	1,852
Soybeans	2,321
Irish potatoes	812
Sugar beets for sugar	545

[1] All farms

Source: 1982 Census of Agriculture, Bureau of the Census, U.S. Department of Commerce. These data will not change until the 1987 Census Bureau figures are available.

Water withdrawn and then returned to streams may be used again as long as acceptable quality is maintained. Only water that is used up (mainly by evaporation and transpiration) so that it does not return to streams reduces the total usable water supply. Agriculture uses 80 out of every 100 gallons that are lost.

Management of water is becoming increasingly important as use approaches available supply. Shortages can occur in any region in any year. In some Western States, current use is already pressing heavily on available supplies. Cities and industries are using increasing amounts and thus intensifying supply and treatment problems. Water pollution is today a major water management problem in most regions.

The total supply of water will not increase. However, more water may be made available for use by conservation, demineralization, storage in surface reservoirs, recharging underground aquifers of water-bearing rocks, converting brushland to grass in lower rainfall areas, and managing vegetative cover, including forests, so as to capture and retain more snowfall.

Water quality and quantity can be improved and energy use reduced by improving irrigation practices. An average water-use efficiency of 70 to 75 percent is an achievable goal.

4. FARM LABOR

Since the turn of the century, farm employment has decreased considerably, falling from 13.6 million in 1910 to 2.9 million in 1987. During the last decade, the number of family operators and unpaid family members continued to decline, while hired farm employment appears to have stabilized after the long-term downward trend of previous years.

Family workers were still the dominant labor source, but accounted for a smaller proportion of total farm employment. In 1987, family farm labor comprised about two-thirds of farm employment, compared to three-quarters during the 1960's. Growth in the sizes of farms and in the amount of farm labor required per farm contributed to the substitution of hired farmworkers for family labor on individual farms.

In 1987, there were 2.5 million persons who did some hired farmwork during the year. Hired farmworkers in 1987 were predominantly young (47 percent under 25 years) and male (80 percent).

About 78 percent were whites, 14 percent were Hispanics, and 8 percent were blacks and others.

Most of the hired farm work force were seasonal workers who worked for a few days or months during peak planting and harvesting periods. In 1987, only 19 percent worked for 250 days or more; over two-thirds worked on a casual or seasonal basis for less than 150 days.

Many of the hired farmworkers had a weak labor force attachment. In 1987, only 60 percent were in the labor force most of the year, while the remainder cited attending school or doing housework as their primary activity.

About 29 percent of all farmworkers cited hired farmwork as their chief activity during the year, and another 22 percent cited nonfarmwork as their primary employment status.

Farmwork continues to be a relatively low-paying occupation. In 1987, all hired farmworkers averaged $6,663 in annual earnings from all sources, with $3,368 (51 percent) from farmwork.

In the same year, the average earnings for all U.S. private sector nonagricultural production workers was $16,250.

Earnings varied considerably among different groups of farmworkers. For example, workers citing hired farmwork as their primary activity received an average of $8,655 in total earnings; almost all (93 percent) of this came from farmwork.

Persons citing nonfarmwork as their major activity averaged $13,676 in annual earnings, with only 11 percent received from farmwork.

Persons not in the labor force most of the year received an average of $2,060, with 59 percent from farm earnings.

These data suggest that hired farmworkers are not a homogeneous group of workers. They vary by demographic characteristics, employment experiences, and earnings.

5. FARM MACHINERY

Increased agricultural mechanization since the 1940's has helped make U.S. farmers the most productive in the world. Increases in the power and size of farm machinery have dramatically reduced labor requirements in the United States, spurring the mass migration of nearly 7 million people from the farm sector since World War II.

Many crop production activities that once required either intensive seasonal labor or constant attention are now easier to manage as farms have become more mechanized. For example, fresh fruits and vegetables are now available to consumers year round, due in part to more efficient mechanical harvesting, improved storage and transportation, and increased mechanization throughout the entire marketing chain.

Along with mechanization of their operations, farmers began to use other purchased inputs more intensively. The development of higher yielding crop varieties, commercial fertilizers, pesticides, and effective application equipment encouraged farmers to increase agrichemical use more than eightfold between 1945 and 1982. Greater use of purchased inputs has helped total annual U.S. crop production more than double during this period.

Livestock increasingly are being raised in highly efficient, confined facilities. Automated feeding, watering, and milking systems have improved feed conversion rates and increased productivity, thus lowering unit production costs and freeing growers for other enterprises.

In the case of field crop production, many farmers are adopting conservation tillage practices in order to lower operating costs, to reduce soil erosion, or to meet conservation

Table 5.—Indexes of total farm input and major input subgroups, United States, 1920-86*

(1977 = 100)

Year	Total inputs*			Farm* Labor[3]	Farm real estate[4]	Mechanical power and machinery[5]	Agricultural chemicals[6]	Feed, seed, and livestock purchases[7]	Taxes and interest[8]	Miscellaneous[9]
	All	Non-purchased[1]	Purchased[2]							
1920	90	180	36	324	105	27	5	23	62	65
1921	87	170	36	299	103	27	3	26	74	59
1922	88	173	37	309	104	26	4	25	72	60
1923	89	174	37	311	104	27	4	25	72	60
1924	90	176	39	315	104	27	5	31	71	62
1925	91	177	39	321	103	28	5	28	69	63
1926	92	177	41	322	103	29	5	29	71	65
1927	91	174	41	309	104	31	5	29	72	61
1928	93	177	42	315	105	32	6	29	73	62
1929	93	177	42	312	107	33	6	28	75	62
1930	93	176	42	309	104	34	6	27	76	60
1931	92	178	40	316	102	32	5	24	77	63
1932	89	173	38	305	100	30	4	25	80	61
1933	88	170	38	304	100	27	4	28	77	60
1934	82	156	37	273	100	27	5	25	70	55
1935	84	158	39	284	102	28	5	23	64	55
1936	85	156	42	276	102	29	6	31	69	54
1937	90	164	44	298	104	32	7	30	64	59
1938	88	158	44	278	104	33	7	31	70	55
1939	90	158	47	279	105	34	7	37	73	56
1940	91	159	48	278	107	36	9	39	74	57

Table 5.—Indexes of total farm input and major input subgroups, United States, 1920-86*—Continued

(1977 = 100)

Year	Total inputs*			Farm* Labor[3]	Farm real estate[4]	Mechanical power and machinery[5]	Agricultural chemicals[6]	Feed, seed, and livestock purchases[7]	Taxes and interest[8]	Miscellaneous[9]
	All	Nonpurchased[1]	Purchased[2]							
1941	92	158	49	273	105	37	9	42	74	57
1942	95	166	50	280	103	44	10	44	75	55
1943	96	166	51	276	102	47	11	48	78	57
1944	97	167	52	274	101	49	13	48	80	59
1945	94	161	51	257	102	50	13	50	82	58
1946	93	155	53	247	106	49	14	49	82	59
1947	104	174	59	297	106	54	15	51	82	60
1948	104	170	60	285	107	62	16	52	80	63
1949	108	172	65	285	108	68	18	56	83	66
1950	106	167	64	265	109	72	19	58	83	63
1951	106	164	66	251	109	77	21	62	84	68
1952	105	162	67	237	108	81	23	63	86	67
1953	103	157	66	220	108	82	24	63	87	67
1954	102	157	65	214	108	82	24	65	87	65
1955	104	155	69	220	108	83	26	66	89	68
1956	103	150	70	212	106	84	27	69	89	65
1957	100	142	69	196	105	83	27	68	88	68
1958	98	136	71	182	104	83	28	73	89	71
1959	101	135	74	183	105	84	32	77	94	75
1960	99	130	76	177	103	83	32	77	95	77
1961	98	125	76	167	103	80	35	81	96	78

1962	98	124	78	163	104	80	38	83	98	81
1963	98	118	80	155	104	79	43	83	99	83
1964	98	116	81	148	104	80	46	85	101	87
1965	97	114	82	144	103	80	49	86	101	85
1966	96	111	83	132	102	82	56	89	102	82
1967	98	109	87	128	104	85	66	92	102	80
1968	97	109	87	124	102	86	69	89	102	85
1969	96	106	87	118	102	86	73	93	101	85
1970	96	106	87	112	105	85	75	96	102	89
1971	96	103	90	108	103	87	81	102	101	89
1972	97	103	91	110	102	86	86	104	102	92
1973	98	103	93	109	100	90	90	107	102	90
1974	98	103	93	109	99	92	92	99	103	87
1975	97	103	90	106	97	96	83	93	100	82
1976	98	100	96	100	98	98	96	101	102	90
1977	100	100	100	100	100	100	100	100	100	100
1978	102	100	105	100	100	104	107	108	99	103
1979	105	100	111	99	103	104	123	115	103	113
1980	103	100	106	96	103	101	123	114	100	96
1981	102	98	106	96	104	98	129	108	99	108
1982	99	96	102	93	102	92	118	107	92	115
1983	97	92	102	97	101	89	105	109	97	100
1984	95	90	100	92	97	85	121	105	88	110
1985	92	86	98	85	95	81	121	105	91	117
1986[10]	87	83	91	80	93	76	109	102	91	110

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[*] Revisions made last year in the labor input series produced extensive changes to the indexes for labor, purchased, nonpurchased, and total input indexes.

[1] Includes operator and unpaid family labor, and operator-owned real estate and other capital inputs. [2] Includes all inputs other than nonpurchased inputs. [3] Includes hired, operator, and unpaid family labor. [4] Includes all land in farms, service buildings, grazing fees, and repairs on service buildings. [5] Includes interest and depreciation on mechanical power and machinery repairs, licenses, and fuel. [6] Includes fertilizer, lime, and pesticides. [7] Includes nonfarm value of feed, seed, and livestock purchases. [8] Includes real estate and personal property taxes, and interest on livestock and crop inventory. [9] Includes such things as insurances, telephone, veterinary fees, containers, and binding materials. [10] Preliminary.

standards as outlined in the 1985 Farm Bill. Implements such as ridge-till planters and no-till drills allow farmers to plant crops with little or no seedbed preparation.

Today, U.S. agriculture can generally be characterized as a mature market for farm machinery where tractors and implements are purchased to replace older equipment.

Since 1979, when farmers purchased a record $11.75 billion of new and used machinery, high real interest rates, declining profitability in agriculture, and, more recently, paid land diversions have helped drive farm machinery expenditures down to a low of 4.6 billion by 1986. Farm machinery sales rose to $5.83 billion in 1987 as farm incomes improved and farmers sought to replace older equipment.

The U.S. farm machinery industry has responded to the downturn in demand by offering attractive sales incentives. It also has reduced total output to reduce shortrun operating costs and market inventories and has undertaken consolidation efforts to reduce excess productive capacity. With the recent improvement in farm machinery sales, farmers are not likely to see sales incentives as significant as those offered in recent years.

6. FARM EXPENSES

Farmers spent $123.5 billion on production goods and services in 1987, about 73 cents for every dollar of gross income from farming and government payments. Expenses in 1987 were 1 percent higher than in 1986, ending a 2-year decline.

Until 1985, production expenses had increased each year since 1953. Expenses fell 6 percent between 1984 and 1985, and 9 percent between 1985 and 1986. After the increase in 1987, expenses remained 13 percent below 1984. Table 6 shows some major expense items for selected years from the last two decades.

Much of the recent decline in expenses is due to lower input prices, acreage reduction caused by government programs and lower commodity prices, lower per acre application rates, and, in general, more cost-conscious management.

The index of prices paid for production items, interest, taxes, and wage rates rose 1 percent between 1986 and 1987. Planted and harvested acres of principal crops both declined 4 percent during this period.

A longer perspective shows that total production expenses (not adjusted for inflation) increased by 348 percent between 1964 and their peak in 1984 but then fell 14 percent between

Table 6.—Farm production expenses, 1964, 1969, 1974, 1979, 1982, 1987

[In billions of dollars]

Major items	1964	1969	1974	1979	1982	1987
Purchased feed	5.5	7.1	14.5	19.3	18.6	16.1
Purchased livestock	2.4	4.2	5.1	13.0	9.7	12.0
Repair and maintenance	3.9	4.5	6.7	7.3	6.4	6.5
Capital consumption	4.9	6.6	10.5	19.3	24.3	17.3
Fertilizer and lime	1.9	2.3	6.1	7.4	8.0	5.4
Short-term interest	1.0	1.4	2.9	6.9	11.3	7.3
Mortgage interest	1.0	1.6	2.8	6.2	10.5	8.2
Property taxes	1.8	2.5	3.1	3.9	4.0	4.3
Labor	3.5	4.2	6.1	9.0	10.1	10.7
Total production expenses	31.8	42.1	71.0	123.3	140.0	123.5

1984 and 1986. Expenses in 1987 stood at almost the exact level of 1979 expenses. Much of the long-term increase in production expenses was due to inflation, increased capital investment in agriculture, and greater purchases of services and inputs.

The index of prices paid by farmers for production items, interest, taxes, and wage rates rose 251 percent between 1964 and 1987, and 22 percent between 1979 and 1987. This index of farm input prices increased less, however, than the Consumer Price Index (CPI), which rose by 266 percent between 1964 and 1987 and by 56 percent between 1979 and 1987.

As farm operations over time have become more specialized, farmers have invested in special machinery, equipment, and buildings. Specialization has also led to greater purchases of goods and services from others. For example, many farmers buy feed rather than grow it. Suppliers may construct buildings, install fences, test soils, or lease equipment—activities that most farmers used to perform themselves.

Farmers have also increased their use of credit. Total farm-related debt increased each year from 1944 to 1982. During the first part of this period, the increase was relatively steady. In the late seventies and early eighties, the increase accelerated until total debt peaked in 1982 at $206.5 billion. Since the 1982 peak, total farm debt has declined to $153.3 billion in 1987.

Interest paid by farmers followed a pattern similar to that for total debt—steady increases since the forties and then an acceleration in the late seventies and early eighties. Interest expenses also peaked in 1982 at $21.8 billion. They have since declined to $15.5 billion. Part of the increase in the late seventies was due to increases in interest rates.

Expenses for major overhead items—capital consumption, taxes, and interest on farm mortage debt—tended to rise faster than current operating expenses over most of the last decade. Overhead costs, however, declined more quickly in 1985 and 1986 than operating expenses. In 1987, these expenses fell 7 percent while operating expenses rose 5 percent.

USDA forecasters expect production expenses to increase again in 1988, despite the drought. They project that 1988 expenses will have been between $126 and $129 billion, a rise of 2 to 4 percent.

Table 7.—Farm debts, 1940, 1950, 1960, 1970, and 1983-87

[In billions of dollars]

	Farm debt outstanding, December 31									
	1940	1950	1960	1970	1980	1983	1984	1985	1986	1987
Real estate debt:										
Federal land banks	2.7	1.0	2.5	7.1	36.2	48.8	49.1	44.7	37.7	32.3
Life insurance companies	1.0	1.4	3.0	5.6	12.9	12.7	12.4	11.8	10.9	9.9
Banks	0.5	1.0	1.6	3.8	8.6	9.3	10.2	11.4	12.7	14.5
Farmers Home Administration	0.1	0.3	0.7	2.4	8.2	9.5	10.1	10.4	10.3	10.1
Individuals and others	2.2	2.5	5.0	11.4	30.2	32.3	29.9	27.2	24.0	20.6
CCC storage and drying facilities loans	0.0	*	*	0.1	1.5	0.9	0.6	0.3	0.1	*
Total	6.5	6.1	12.9	30.5	97.5	113.7	112.4	105.9	95.8	87.4
Nonreal estate debt:										
Banks	1.0	2.5	5.0	11.1	31.6	39.0	39.6	35.5	31.2	29.0
Production credit associations[1]	0.2	0.5	1.6	5.5	20.5	20.2	18.8	14.6	11.0	9.7
Farmers Home Administration	0.5	0.3	0.4	0.8	11.4	14.6	15.6	16.7	16.4	16.0
Individuals and others[2]	1.7	2.8	5.0	4.9	17.7	18.9	18.0	15.4	12.4	11.1
Total	3.3	6.1	12.0	22.3	81.2	92.7	92.0	82.2	71.0	65.9
Total	9.8	12.3	24.8	52.8	178.7	206.5	204.4	188.0	166.8	153.3

[1] Includes loans to other financial institutions (OFL's)

[2] Includes Small Business Administration loans

*Less than 0.05

7. FERTILIZER

Commercial fertilizers enable farmers to maintain soil fertility, increase production, and reduce unit costs of crop production through increased yields per acre and per farmworker.

Farm consumption of primary plant nutrients—nitrogen (N), phosphate (P_2O_5), and potash (K_2O)—in the United States rose to a record 23.7 million tons in 1981, ending a 40-year expansion in fertilizer use.

After 1981, fertilizer consumption dropped 24 percent to 18.1 million tons in 1983, following a sharp drop in crop acres in that year.

In 1984, fertilizer use increased to 21.8 million tons because of a rebound in crop acres and remained close to that total in 1985. However, by 1987 fertilizer use dropped again to 19.2 million tons as crop acreage declined.

Fertilizer application rates are beginning to level off or even decline for some crops, making consumption of plant nutrients heavily dependent on crop acres planted.

Nitrogen is about 54 percent of total nutrient consumption, while phosphate and potash are 21 and 25 percent, respectively.

Four crops—corn, cotton, soybeans, and wheat—use about two-thirds of the primary plant nutrients. Corn alone uses over 40 percent of the total.

Mixed fertilizer and bagged fertilizer as a proportion of total fertilizer have continued to decline. In 1987, mixed fertilizer comprised about 11 percent of total consumption, compared with 47 percent 10 years earlier.

Dry bagged fertilizer made up 18 percent of total consumption in 1976, but declined to less than 10 percent in 1987. The proportion of dry bulk and fluid fertilizers increased from 50 to 52 percent and 32 to 38 percent, respectively.

Farmers are using higher analysis fertilizer materials. Average primary nutrient content increased from 44 percent in 1976 to 46 percent in 1987. Nitrogen content increased the most—from about 22 percent in 1976 to about 25 percent in 1987. Potash content was up less than 1 percentage point from 1976 to 11.7 percent, while phosphate content was down over 1 percent to about 10 percent.

8. LIVESTOCK AND POULTRY FEED

Providing feed and feeding livestock and poultry are important parts of today's agricultural industry, involving not only the farmers and ranchers but also the formula feed and grain processing industry. About 28 percent of grains fed are used on the farms where they are grown. The rest moves through commercial channels.

In the crop year 1986-87, the livestock and poultry industries consumed 478.0 million tons of feed and roughage, slightly less than the 480.3 million tons fed in 1965-66. The quantity of concentrates fed increased 35 percent, while roughage consumption declined 17 percent. This change reflects both increased intensity of feeding and productivity gains in livestock and poultry production.

The livestock and poultry fed totaled 76.1 million grain-consuming animal units (GCAU) in 1986-87, up 2 percent from 74.4 million units on hand in 1965-66. Roughage-consuming animal units (RCAU) declined 11 percent from 88.9 million units to 79.0 million.

Some significant shifts occurred in the composition of the grain- and roughage-consuming animal units between 1965 and 1986. Poultry accounted for 28 percent of the GCAU's in 1986-87, compared with 22 percent of the total in 1965-66.

The major shift in the composition of RCAU's has been a decline in the number of dairy cows and heifers and a small increase in beef cattle and horses.

Pasture forage accounted for 38 percent of the total tonnage of feed used in 1986-87. This highlights the importance of the livestock industry in efficient use of land. Most of the area pastured is land that cannot be cropped. However, livestock enables this land to make a significant contribution to the food supply of the United States.

Technology for production of livestock and poultry has advanced tremendously, particularly in the last 20 years. This includes many innovations in feed formulation and handling.

Progress in feed technology has been possible through developments in nutritional knowledge and genetic improvement in both livestock and poultry. Research also has improved methods of housing livestock, and the bulk formulation, mixing, transporting, and distribution of feeds.

One result has been to reduce labor needed on farms. This has been associated with the development of very large poultry and livestock feeding enterprises.

Increasing quantities of poultry and livestock are coming from large enterprises built to a great extent around feed manufacturing. Most of these enterprises have a feed mill at or near the feeding location. Some feed their own livestock, but many others also feed livestock belonging to other firms or individuals. Many mills have custom grinding and mixing services and prepare feeds according to specifications of feed purchasers.

Table 8.—Kinds and quantities of feed consumed by livestock and poultry, feeding years 1965-66 and 1987-88[1]

Feed materials	1965-66 feeding year (million tons)	Percent of total	1987-88 feeding year (million tons)	Percent of total
Grains:				
Corn	81.5	16	124.9	25.1
Other feedgrains	32.1	7	24.4	4.9
Wheat and rye	3.0	1	8.3	1.7
Protein feeds	31.7	6	25.5	5.1
Byproduct feeds	11.5	3	10.2	2.0
Total concentrates	160.4	33	193.3	38.8
Hay	49.4	10	100.1	20.1
Other harvested roughages	26.3	5	21.3	4.3
Pasture	249.1	52	183.0	36.8
Total roughage	324.8	67	304.4	61.2
Total, all feeds	485.3	100	497.7	100.0

[1] Measured in feed units (corn equivalents).

9. AGRICULTURAL CREDIT

The use of credit has played a major part in the growth of agricultural productivity. Farmers have expanded their use of credit rapidly in the last quarter of a century to finance purchases of land, equipment, and livestock; to cover operating expenses; and to increase their acreage.

Total farm debt (excluding Commodity Credit Corporation loans and household debt) at the beginning of 1988 was $142.7 billion, down from the peak of $192.7 billion in 1983.

Rising agricultural land values throughout the 1970's allowed farmers to substantially increase their use of farm real estate loans, which are secured by a lien or mortgage on farmland or real property. However, declining average farmland values after 1981-82, together with reduced net farm income, left some farmers in financial distress. While ample credit is available from commercial lenders, qualifying for it has become difficult.

Real estate loans ordinarily are used to purchase farmland or make major capital improvements to farm property. They may also be used to refinance existing debts and particularly to consolidate short-term debts.

Farm real estate debt (excluding household debt) totaled $80.8 billion at the beginning of 1988. Institutional lenders, such as the Federal Land Banks of the cooperative Farm Credit System, life insurance companies, commercial banks, and USDA's Farmers Home Administration (FmHA), hold nearly three-quarters of the farm real estate loans. Individuals and other unclassified lenders hold the remainder.

Many of the individuals supplying farm credit are the sellers of farmland. That is one method of transferring farm property and can be advantageous to both the buyer and the seller. The downpayment is often less and the interest rate on the balance is usually lower than with regular institutional lenders. The seller collects the sales price of the land plus the interest over a period of years, which provides an investment and a prolonged income.

Farm loans (excluding Commodity Credit Corporation loans) not secured by farmland amounted to $61.9 billion at the end of 1987. These funds are used for operating and living expenses; to buy equipment, motor vehicles, and livestock; to make minor improvements to farm property; and for many other purposes.

Institutional lenders such as commercial banks, Production Credit Associations of the cooperative Farm Credit System, and the FmHA hold about 82 percent of such loans. Merchants, dealers, individuals, and other lenders hold the rest.

The Farm Credit System is a federally chartered cooperative that obtains its loan funds by selling securities to investors. The System is completely owned and controlled by its users-farmers and their cooperatives. An agency of the Executive Branch of the Federal Government, the Farm Credit Administration (FCA) is responsible for regulating the System. The FCA operates under a three-member, full-time FCA Board. The members of the Board are appointed for 6-year staggered terms by the President of the United States. No more than two members may be from the same political party.

The Farm Credit System provides in total about one-third of the credit used by farmers and about one-half of the credit used by their cooperatives. In mid-1988, farmers and their cooperatives had outstanding loans with the System totaling more than $53 billion.

Until 1988, lending of the System was provided through 12 Federal Land Banks and local Federal Land Bank Associations; 12 Federal Intermediate Credit Banks and their local Production Credit Associations; and 13 Banks for Cooperatives from which farmers' marketing, purchasing, and business service cooperatives obtained loans.

The financial strength of the Farm Credit System has been severely weakened in the 1980's, due mainly to the recent farm financial reverses. High loan failures, declining loan demand, and other factors caused the System to report net losses totaling $4.7 billion for 1985 and 1986.

Because of the losses, legislation was proposed at the end of

1987 which included a $4 billion assistance package. The package mandated a wide variety of operational and structural changes within the FCS. Included in these changes was a requirement for the Federal Land Bank and the Federal Intermediate Credit Bank of each of the 12 districts to merge into a single Farm Credit Bank during 1988. Most Banks for Cooperatives have voluntarily agreed to merge into a single nationwide institution during 1989.

The Federal Land Bank Associations, of which there are now 255, provide long-term financing for farm real estate and rural housing. The 137 Production Credit Associations provide farmers with financing for operating credit, machinery, livestock, and other credit needs and services. Both offer their member borrowers a range of related financial services.

The USDA's FmHA makes loans and grants to farmers and other rural residents who cannot get credit elsewhere for farming, housing, and rural development purposes. In addition, the agency guarantees loans made by other lenders, who would not extend credit without a guarantee. More than half of its financial assistance to farmers is now provided in the form of loan guarantees. The agency was created to help farmers by making higher risk loans than those that are considered justifiable by other lending agencies.

Farm ownership loans are designed to help farmers buy farms or land or enlarge farms; construct or repair buildings; improve land; and develop, conserve, and make proper use of their land and water resources.

The maximum farm ownership loan may not exceed $200,000, although FmHA will guarantee loans as high as $300,000 from other credit sources. The interest rates and repayment terms for guaranteed loans are negotiated between borrowers and lenders, within FmHA guidelines.

Operating loans are extended primarily to help farmers purchase equipment, livestock, feed, seed, and fertilizer; for other farm and home operating needs; to refinance chattel debts; and to carry out forestry and aquaculture projects.

Farm operating loans made by FmHA may not exceed $200,000; but, again, the agency can guarantee loans to farmers from other credit sources as high as $400,000. Loans are to be repaid over a period not exceeding 7 years, but extensions sometimes are granted. Interest rates on direct loans are based on the rate for current Government borrowing.

Youth project loans are made to rural young people between the ages of 10 and 20 years to finance income-producing farm or nonfarm enterprises that are carried out under an organized and supervised program, such as Future Farmers of America.

Reduced interest rates for ownership and operating loans can be made to beginning and other limited-resource farmers for the first 3 years of the loan, if they cannot afford to pay the full cost-of-money rates.

For farm loans guaranteed by the agency, an Interest Rate Reduction Program is available to farmers. In the program, FmHA matches up to 2 percentage points, the amount which the lender agrees to reduce the interest cost charged on the loan.

Low-interest emergency loans are available to eligible farmers and ranchers who have suffered qualifying losses from natural disasters in areas that are named by the President, the Secretary of Agriculture, or the FmHA Administrator as emergency disaster areas. Emergency loans cannot exceed $500,000.

Loans or loan guarantees are made for irrigation, drainage, other soil and water conservation facilities, and for grazing associations. Loans are amortized up to 40 years at an interest rate based on the rate for current Government borrowing. Loans are made to Indian tribes to acquire land within a reservation or Alaskan community for tribal use. These loans are repayable in 40 years.

In FmHA's housing programs, interest rates are determined by rates for current Government borrowing, except that low-income households may qualify for rates as low as 1 percent. Loan programs include the following:

(1) Home ownership loans to purchase, refinance, or improve existing residences; build new houses; and acquire building sites. Maximum term is 33 years, with a possible extension to 38 years in some cases.

(2) Rural rental housing loans to provide rental housing for persons with low or moderate income and for persons age 62 or over. These loans can be coupled with rental assistance payments to reduce rents paid by low-income tenants to no more than 30 percent of their income. Maximum repayment period is 50 years.

(3) Rural housing repair loans or grants to senior citizens with very low income and loans to low-income persons to make repairs and to remove health and safety hazards. Maximum grant is $5,000 and maximum loan or loan and grant combination is $7,500. Maximum loan term is 20 years.

(4) Farm labor housing loans to finance low-rent housing for domestic farm laborers. Interest rate is 1 percent and maximum term is 33 years. Grants not exceeding 90 percent of development cost of farm labor housing projects are available under some conditions.

(5) Loans for development of rural homesite areas.

(6) Self-help site development loans and grants to nonprofit organizations providing technical assistance to low-income families building homes by the self-help method.

Community programs provide financial assistance for community facilities, for public use in rural areas and towns of up to 20,000 population, and for water and waste disposal systems in towns of up to 10,000 population. Maximum loan term is 40 years, and the interest rate is based on current market yields of municipal obligations. Development grants may be made to pay up to 75 percent of the cost of constructing water and sewer systems.

Resource conservation and development loans are made in designated areas. These loans cannot exceed $500,000 and are amortized up to 30 years.

Watershed loans are made to finance the local share of costs in projects approved under the Watershed and Flood Prevention Act or in connection with the 11 watershed improvement programs authorized by the Flood Control Act of 1944. They cannot exceed $10 million and are amortized up to 50 years.

The interest rate on these loans is determined by the Secretary of the Treasury at the beginning of the fiscal year.

The business and industrial loan program provides financial assistance to individuals, public and private organizations, and federally recognized Indian tribal groups for furthering business and industrial development in rural areas. Loans are guaranteed for projects in the open countryside or in towns of up to 50,000 population. Preference is given to towns with fewer than 25,000 people.

As of October 1, 1988, REA's Electric Program had loaned or guaranteed $51.2 billion to approximately 1,100 electric systems.

REA's Telephone Program had loaned or guaranteed $6.1 billion from the Revolving Fund and loaned $2.4 billion from the Rural Telephone Bank to about 1,000 telephone cooperatives and companies.

During fiscal year 1988, 43 borrowers repaid in full their Rural Telephone Bank loans. Principal repayments amounted to $37,896,003; waived premiums totaled $2,574,484. Sixty-seven borrowers made partial prepayments of $93,437,452 on Rural Telephone Bank loans; waived premiums totaled $7,136,309.

In addition to improving and expanding electric and telephone service to meet rural demands, REA encourages its borrowers to assist in local rural economic development projects. Rural utility systems are in a unique position of leadership to provide the initiative, as well as financial and technical assistance, for rural development projects.

Electric systems can now invest up to 15 percent of total distribution utility plant, using internally generated funds, in rural development projects without prior approval of the REA Administrator, pursuant to the Omnibus Budget Reconciliation Act of 1987 (OBRA).

OBRA also created the establishment of the REA Rural Economic Development Loan and Grant Program in 1988. The program will provide zero interest loans and grants to borrowers for the purpose of promoting rural economic development and job creation projects. All REA borrowers are eligible for funds under the new program provided they are current on all payments and not in bankruptcy proceedings.

For these loans, FmHA assistance is provided in the form of guarantees that assure payment to the lender of up to 90 percent of any loss of principal and interest. Terms of the loans, including repayment period and interest rates, are determined between borrower and lender, within FmHA guidelines.

USDA's Rural Electrification Administration (REA) makes loans and loan guarantees to rural electric and telephone utilities to provide service in rural areas.

REA was established by Executive Order in May 1935 as part of a general program of unemployment relief. Statutory authority was provided by the Rural Electrification Act of 1936, establishing REA as a lending agency with responsibility for developing a rural electrification program. In October 1949, an amendment to the law authorized REA to make loans to extend and improve telephone service in rural areas.

The Rural Telephone Bank (RTB) was authorized by law in May 1971 to provide supplemental financing from non-Federal sources for telephone systems. The RTB is an agency of the United States in USDA. Its management is vested in a Governor (the REA Administrator) and Board of Directors consisting of appointed and stockholder-elected members. Rural Telephone Bank loans are made for the same purpose as REA direct telephone loans and bear interest at the RTB's cost of money rate.

In May 1973 an amendment established the Rural Electrification and Telephone Revolving Fund in the U.S. Treasury as the source of REA funds for loans and loan guarantees. By statute, REA loans are made at 5 percent interest; in special hardship cases, 2 percent loans can be made at the discretion of the Administrator.

The Revolving Fund is replenished through collections on outstanding REA loans, direct appropriations by Congress over the past several years, and from REA's sale of Certificates of Beneficial Ownership (CBOs) to the Federal Financing Bank. Certificates are secured by borrowers' notes, and their repayment is insured by REA. Annual loan levels are established by Congress for the agency's lending programs.

The REA loan guarantee program was established in 1974. Loans guaranteed by REA may be obtained from the Federal Financing Bank or any legally organized lending agency qualified to make, hold, and serve a guaranteed loan. Guaranteed loans bear interest at a rate agreed upon by the borrower and the lender.

During fiscal year 1988, six generation and transmission systems (G&Ts) were approved to refinance their long-term, high-interest FFB loans, without premium, in the private sector. Congress approved $2 billion to be refinanced.

The following G&Ts were determined to be in the greatest need of refinancing and subsequently approved:

Big Rivers Electric Corporation, Henderson, KY, $319.4 million;

Cajun Electric Power Cooperative, Inc., Baton Rouge, LA, $1.045.3 billion;

Deseret G&T Cooperative, Sandy, UT, $188.5 million;

Kansas Electric Power Cooperative, Inc., Topeka, KS, $62.4 million;

Tex-La Electric Cooperative of Texas, Inc., Nacogdoches, TX, $102.2 million;

Western Illinois Power Cooperative, Inc., Jacksonville, IL, $285.9 million.

10. THE BALANCE SHEET

Farm asset values including farm households totaled $813.1 billion on December 31, 1987, an increase of 3 percent from the preceding year. Farm debt outstanding decreased in 1987 by 8 percent, totaling $153.3 billion on December 31, 1987. This was the fifth year that loans outstanding decreased. Increases in assets and decreases in debts in 1986 resulted in a 6-percent increase in equity during 1987, compared to a 5 percent decline in 1986. This increase in farm equity reflected the improved cash flow position of some farmers, lower interest rates, and higher returns. On the average, farm equity increased $21,752 to $303,217 per farm on December 31, 1987.

The debt-to-asset ratio decreased during 1986, falling from 21.1 to 18.9 percent during 1987. During the 1970's, the debt-to-asset ratio was 16 to 17 percent.

The value of farm real estate, which accounts for 70 percent of farm assets, increased by 2 percent during 1987. The per acre value rose from $550 on February 1, 1987, to $566 on February 1, 1987. At the end of 1987, the average farm real estate value per farm was $261,000. Five years earlier, it was $338,000.

Livestock and poultry asset values rose by 21 percent during 1987, while machinery and equipment values fell by nearly 7 percent.

The value of household equipment and furnishings rose by 9 percent between December 31, 1986, and December 31, 1987. The value of financial assets (currency, deposits, and savings bonds) rose nearly 7 percent. The value of crops stored on and off farms rose 27 percent.

Farmers' net worth in cooperatives increased by less than 1 percent, after increasing by 2 percent in 1986.

Farm real estate debt, which comprises 57 percent of total debt outstanding, decreased 9 percent to total $87.4 billion on December 31, 1987. Commercial banks' loans outstanding increased by nearly 14 percent, while farm real estate debt held by Federal land banks decreased by 14 percent.

Non-real-estate debt decreased 7 percent to total $66 billion on December 31, 1987. Federal intermediate credit banks had the largest decrease, 40 percent. The Farmers Home Administration (FmHA) had the smallest decrease in such loans—2 percent.

Table 9.—Farmers' assets, debts, and equity, 1940, 1950, 1960, 1970, 1980, and 1985[1]

[In billions of dollars]

Item	1940	1950	1960	1970	1980	1985[1]
Assets:						
Real estate	34.0	88.9	139.9	223.8	850.8	606.4
Physical assets other than real estate[2]	15.0	48.0	53.1	77.0	212.4	190.0
Financial	4.7	16.0	17.9	23.2	39.1	49.0
Total	53.7	152.9	210.9	324.0	1,102.3	845.4
Debts:						
Real estate[3]	6.5	6.2	12.8	30.5	97.5	105.8
Nonreal estate[4]	3.3	6.1	12.0	22.3	81.2	82.2
Total[4]	9.8	12.3	24.8	52.8	178.7	188.0
Equity	43.8	140.7	186.1	271.2	923.6	657.3

[1] As of December 31. Includes farm households.

[2] Crop inventory value is value of non-CCC crops held on farms plus value above loan rate for crops held under CCC.

[3] Includes storage and drying facilities loans.

[4] Excludes value of CCC crop loans.

11. FARM INCOME

U.S. farmers earned a total of $93 billion in income from farm and off-farm sources in 1987. Their farming operations netted $46.3 billion, after adjusting for changes in commodity inventories, depreciation, noncash, and household overhead expenses. This was an increase of 23 percent from 1986. Income from off-farm sources totaled $46.8 billion in 1987, compared with $44.6 billion in 1986.

Farm operators have earned more than 50 percent of their income from off-farm sources during the last several years. Nearly all farm operator families had some off-farm income, but the smaller the farm, the higher the proportion of off-farm income. Those on farms selling less than $20,000 in farm products per year had little, if any, farm income on the average. Thus, the total family income came from off-farm sources.

The largest farm firms, those selling $500,000 or more in farm products per year, averaged less than 4 percent of total income from off-farm sources.

Gross income from farming in 1987 was $160.4 billion, up slightly from the preceding 4-years average. With only the smallest of increases in production expenses (to $123.5 billion), and a $4.9-billion rise in direct Federal subsidies, 1987 net income from farming increased by roughly 23 percent to $46.3 billion.

The gross cash income for 1987 rose, largely due to higher falling cash receipts. Direct Government payments rose from $11.8 billion in 1986 to $16.7 billion in 1987. Inventories were down another $0.6 billion.

Table 10.—Cash and other income from farming, 1987

(In billions of dollars, rounded)

Cash receipts from farm marketings	138.1
Government payments to farmers	16.7
Farm related income	5.6
Gross cash income	160.4
Cash production expenses	103.3
Net cash income	57.1
Nonmoney income	10.0
Value of inventory change	−0.6
Gross income	169.8
Total farm expenses	123.5
Net farm income after inventory adjustment	46.3

Source: Economic Research Service, USDA

The volume of farm output in 1987 rose as favorable growing conditions produced large harvests of major crops. Prices farmers received for their products were higher in 1987 than a year earlier. Prices for livestock and livestock products rose as did crop prices.

Receipts from marketings of livestock and products were up $4.7 billion, while crop sales fell $1.7 billion, from 1986. The combined total of $138.1 billion was $3 billion above 1986. Ranked on the basis of total cash receipts from farm marketings in 1987, California was first with $15.5 billion, Texas second with $9.1 billion, and Iowa third with $8.8 billion.

The other seven States in the top 10 (by order of cash receipts from marketings) were Nebraska, Illinois, Minnesota, Kansas, Florida, Wisconsin, and Indiana.

In 1987, the top 10 States accounted for 52 percent of total cash receipts from farm marketings, with the top five States accounting for one-third. Compared with the top 10 States, all of which had over $3.5 billion in marketing receipts, 10 States together accounted for less than $3 billion in farm marketings. These nonagricultural States accounted for only 2 percent of all farm marketings in 1987.

USDA has been publishing a comprehensive set of income estimates relating to agriculture since the mid-1920's.

Economists develop data on gross farm income, farm production expenses, and the net return to farm operators for their farm work, including that of their families; for their management; and for the capital invested in their farms and equipment.

Net farm income is measured as gross earnings minus total production expenses after inventory adjustment, depreciation, and noncash and household overhead expenses, as noted in earlier paragraphs. It can also be measured on a cash basis as net cash income in which only cash income and expenses are included.

The cash receipt estimates are on a commodity-by-commodity basis, the result of the use of detailed monthly price and marketing estimates by State as provided by the National Agricultural Statistics Service (NASS). The expense estimates are by type of expense account; for the most part they are based on census of agriculture benchmarks, with yearly movements derived from special surveys and NASS estimates of prices paid by farmers.

Table 11.—Average net farm income before inventory adjustment (including operator households) and off-farm income, 1980-87

Year	Net farm income	Off-farm income	Total
	Dollars per farm		
1980	9,221	14,260	22,435
1981	8,378	14,708	20,391
1982	10,374	15,172	24,908
1983	9,927	15,620	23,529
1984	11,151	16,722	25,960
1985	15,230	18,726	34,648
1986	18,226	20,181	40,314
1987	21,546	21,493	46,885

The components used in calculating net income from farming after inventory adjustment for 1981 are shown in the following discussion.

Gross farm income includes five principal components:

1. Cash receipts from farm marketings of farm products represent gross receipts from commercial market sales, as well as loans (net of redemptions) made or guaranteed by CCC and purchases under price-support programs.

2. Government payments to farmers are those made directly to farmers in connection with farm programs.

3. Farm-related income derives from recreation and machine hire and custom work, forest product sales, and miscellaneous sources.

4. Nonmoney income includes the value of farm products consumed directly in farm households and housing provided by farm dwellings. Expenses associated with these products and the dwellings are included in the production expense estimates.

5. Value of inventory change is the change in quantity from beginning to ending of year multiplied by the calendar year average price for each commodity.

Farm production expenses summarize the total costs incurred in farm production. They include current farm operating expenses for such items as wages paid to hired labor (in cash and in kind) and outlays for repairs of equipment and operation of the farm, as well as purchases of oil, feed, seed, and livestock.

Overhead costs include charges for depreciation and other capital consumption, taxes on farm property, and interest on the farm mortgage debt.

Expenditures on new buildings, motor vehicles, and other capital equipment are not included as a production cost. Instead, production expenses include an allowance for annual depreciation and other capital consumption. Estimates of depreciation are based on replacement cost, which is the amount necessary at current prices to replace buildings and equipment used during the year.

Thus, after a period of substantial price increase, as occurred after World War II, the current replacement cost basis results in larger depreciation charges than would estimates on an original cost basis.

Farm operators' net income after inventory adjustment is gross income, after inventory change, minus production expenses. After adjustments for corporate officers' salaries and corporate profits, it is the figure included in the national income estimates by the U.S. Department of Commerce as farm proprietors' income.

Net farm income measures the income generated from the production of a given calendar year. It is an approximation of the net value of agricultural production, regardless of whether the commodities were sold, fed, or placed in inventory during the year. Unlike net cash income, this series includes farm household benefits and expenses.

Farm wages of laborers on farms represents the income received by farm laborers living on farms from wages paid by farm operators.

Net cash income from farming measures the total income that farmers choose to receive in a given calendar year, regardless of the amount of production or the year the marketed output was produced. It approximates the income available to farmers for purchasing assets, such as land or machinery; retiring loans; and paying off all other expenditures, including those for operating the farm household. It is the difference between the gross cash income received (cash receipts, Government payments, and other farm income) minus the cash expenses incurred during a calendar year.

II. THE FARMING OPERATION

12. FARMING REGIONS

The 10 major farming regions in the United States differ in soils, slope of land, climate, distance to market, and in storage and marketing facilities. Together they comprise the agricultural face of the Nation.

The Northeastern States—from Maine to Maryland—and the Lake States—the northern tier of States bordering on the Great Lakes from Michigan to Minnesota—are the Nation's principal milk-producing areas.

Climate and soil in these States are suited to raising grains and forage for cattle and for providing pastureland for grazing.

Broiler farming is important in Maine, Delaware, and Maryland. Fruits and vegetables also are important to the region.

The Appalachian region—Virginia, West Virginia, North Carolina, Kentucky, and Tennessee—is the major tobacco-producing region in the Nation. Peanuts, cattle, and dairy production are also important.

Farther south along the Atlantic is the Southeast region. Beef and broilers are important livestock products. Fruits, vegetables, and peanuts are grown in this region. And, of course, there are big citrus groves and winter vegetable production areas in Florida.

In the Delta States—Mississippi, Louisiana, and Arkansas—the principal cash crops are soybeans and cotton. Rice and sugarcane are also grown. With improved pastures, livestock production has gained in importance. This is a major broiler-producing region.

The Corn Belt, extending from Ohio through Iowa, has rich soil, good climate, and sufficient rainfall for excellent farming. Corn, beef cattle, hogs, and dairy products are the major outputs of farms in the region. Other feed grains, soybeans, and wheat are also important.

Agriculture in the northern and southern Plains, which extend north and south from Canada to Mexico and from the Corn Belt into the Mountain States, is restricted by rainfall in the western portion and in the northern part by cold winters and short growing seasons.

About three-fifths of the Nation's winter and spring wheat is produced in this region. Other small grains, grain sorghum, hay, forage crops, and pastures form the basis for raising cattle. Cotton is produced in the southern part.

The Mountain States—from Idaho and Montana to New

Mexico and Arizona—provide a still different terrain. Vast areas of this region are suited to raising cattle and sheep. Wheat is important in the northern parts. Irrigation in the valleys provides water for such crops as hay, sugar beets, potatoes, fruits, and vegetables.

The Pacific region includes the three Pacific Coast States plus Alaska and Hawaii. Farmers in the northern mainland area specialize in raising wheat, fruit, and potatoes; vegetables and fruit and cotton are important in the southern part. Cattle are raised throughout the entire region. In Hawaii, sugarcane and pineapples are the major crops.

13. FARMS AND LAND IN FARMS

The United States had 2,158,800 farms in 1987, down 0.8 percent from the 2.21 million in 1986 and 11 percent from the 2.43 million in 1981. The number of farms declined from 1 to 3 percent per year from 1981 through 1986. This decline continues the downward trend started in 1936.

Land in farms continues to decline slowly, with the total of 999 million acres in 1988, down 0.4 percent from a year earlier and down 3.4 percent from 1981. Land in farms has declined every year since reaching its peak at 1.206 billion acres in 1954. Some of the loss results from urbanization and highway construction.

Since the number of farms declined at a faster rate than land in farms, the average size of farms increased from 425 acres in 1981 to 463 acres in 1988.

14. FARMS BY SALES CLASSES

More than nine-tenths of all farm products going to market are produced on farms with gross sales of $20,000 or more per year. This upper income group of 772,500 farms as of 1987 makes up most of the commercial agricultural economy of the United States. The operators of these farms do the buying and selling that turn the wheels of an enormous agricultural business and food and fiber marketing complex.

Farms selling $100,000 or more represented about 13.2 percent of total farm numbers in 1987. Their net income before inventory adjustment averaged $118,951 in 1986. In the aggregate they received over 89 percent of the net income received from farming. The proportion of these larger farms has changed little in recent years.

Table 12.—States ranked by cash receipts (including net Commodity Credit Corporation loans), 1987

[In millions of dollars]

State	Total	Livestock and livestock products	Crops	The five leading commodities ranked by cash receipts				
				1.	2.	3.	4.	5.
Alabama	2,148	1,560	588	Broilers	Cattle/calf	Eggs	Grnhs/nurs	Peanuts
Alaska	29	11	19	Grnhs/nurs	Dairy prods	Hay	Potatoes	Cattle/calf
Arizona	1,781	774	1,007	Cattle/calf	Cotton	Dairy prods	Lettuce	Grnhs/nurs
Arkansas	3,143	2,116	1,027	Broilers	Soybeans	Cattle/calf	Cotton	Eggs
California	15,522	4,741	10,781	Dairy prods	Cattle/calf	Grnhs/nurs	Grapes	Cotton
Colorado	3,191	2,321	870	Cattle/calf	Wheat	Dairy prods	Corn	Hay
Connecticut	366	196	170	Grnhs/nurs	Eggs	Dairy prods	Tobacco	Cattle/calf
Delaware	485	370	114	Broilers	Grnhs/nurs	Soybeans	Dairy prod	Corn
Florida	5,227	1,102	4,125	Grnhs/nurs	Oranges	Tomatoes	Cattle/cal	Cane/sugar
Georgia	3,087	1,826	1,261	Broilers	Peanuts	Cattle/calf	Eggs	Hogs
Hawaii	559	88	471	Cane/sugar	Pineapples	Grnhs/nurs	Macad.nuts	Dairy prods
Idaho	2,047	926	1,120	Cattle/calf	Potatoes	Dairy prods	Wheat	Sugar beets
Illinois	6,174	2,262	3,913	Corn	Soybeans	Hogs	Cattle/cal	Dairy prods
Indiana	3,872	1,856	2,016	Corn	Soybeans	Hogs	Cattle/cal	Dairy prods
Iowa	8,780	5,270	3,510	Hogs	Cattle/calf	Soybeans	Corn	Dairy prods
Kansas	5,722	3,914	1,807	Cattle/calf	Wheat	Sorghum	Soybeans	Hogs
Kentucky	2,419	1,506	913	Horse/mule	Cattle/calf	Tobacco	Dairy prod	Hogs
Louisiana	1,420	521	899	Cotton	Soybeans	Cattle/calf	Cane/sugar	Dairy prods
Maine	413	243	170	Potatoes	Dairy prods	Eggs	Cattle/cal	Blueberries
Maryland	1,128	734	394	Broilers	Dairy prods	Grnhs/nurs	Cattle/cal	Soybeans
Massachusetts	393	124	268	Grnhs/nurs	Dairy prods	Cranberries	Eggs	Apples
Michigan	2,504	1,285	1,219	Dairy prods	Cattle/calf	Hogs	Corn	Grnhs/nurs
Minnesota	5,809	3,645	2,165	Dairy prods	Cattle/calf	Hogs	Soybeans	Corn
Mississippi	1,979	1,040	939	Cotton	Broilers	Soybeans	Cattle/cal	Aquaculture
Missouri	3,691	2,173	1,517	Cattle/calf	Soybeans	Hogs	Dairy prod	Corn
Montana	1,347	760	587	Cattle/calf	Wheat	Barley	Dairy prod	Sugar beets

Table 12.—States ranked by cash receipts (including net Commodity Credit Corporation loans), 1987—Continued

[In millions of dollars]

State	Total	Livestock and livestock products	Crops	The five leading commodities ranked by cash receipts				
				1.	2.	3.	4.	5.
Nebraska	6,823	4,848	1,975	Cattle/calf	Corn	Hogs	Soybeans	Wheat
Nevada	243	167	76	Cattle/calf	Hay	Dairy prods	Potatoes	Sheep/lambs
New Hampshire	104	66	38	Dairy prods	Grnhs/nurs	Cattle/calf	Apples	Eggs
New Jersey	563	139	423	Grnhs/nurs	Dairy prods	Eggs	Tomatoes	Blueberries
New Mexico	1,147	817	331	Cattle/calf	Dairy prods	Hay	Grnhs/nurs	Chili pepper
New York	2,527	1,800	726	Dairy prods	Grnhs/nurs	Cattle/calf	Apples	Onions
North Carolina	3,715	2,081	1,634	Tobacco	Broilers	Hogs	Turkeys	Dairy prods
North Dakota	2,308	760	1,548	Wheat	Cattle/calf	Barley	Sunflowers	Dairy prods
Ohio	3,422	1,614	1,808	Soybeans	Dairy prods	Corn	Hogs	Cattle/calf
Oklahoma	2,752	2,052	700	Cattle/calf	Wheat	Dairy prods	Broilers	Cotton
Oregon	1,861	655	1,206	Cattle/calf	Grnhs/nurs	Dairy prods	Wheat	Onionions
Pennsylvania	3,224	2,319	905	Dairy prod	Cattle/calf	Grnhs/nurs	Eggs	Mushrooms
Rhode Island	75	12	63	Grnhs/nurs	Dairy prods	Eggs	Potatoes	Apples
South Carolina	931	461	470	Tobacco	Cattle/calf	Dairy prods	Soybeans	Broilers
South Dakota	2,723	1,910	813	Cattle/calf	Hogs	Wheat	Soybeans	Dairy prods
Tennessee	1,933	1,107	826	Cattle/calf	Dairy prods	Cotton	Grnhs/nurs	Soybeans
Texas	9,086	6,059	3,027	Cattle/calf	Cotton	Dairy prods	Grnhs/nurs	Broilers
Utah	596	462	134	Cattle/calf	Dairy prods	Hay	Turkeys	Sheep/lambs
Vermont	412	377	35	Dairy prods	Cattle/calf	Hay	Apples	Maple prods
Virginia	1,692	1,244	448	Cattle/calf	Dairy prods	Broilers	Tobacco	Turkeys
Washington	2,841	982	1,860	Dairy prods	Apples	Cattle/calf	Wheat	Potatoes
West Virginia	221	169	52	Cattle/calf	Dairy prods	Broilers	Apples	Turkeys
Wisconsin	5,017	4,222	795	Dairy prods	Cattle/calf	Hogs	Corn	Potatoes
Wyoming	642	528	114	Cattle/calf	Sugar beets	Sheep/lambs	Hay	Wheat
United States	138,094	76,218	61,876					

Table 13.—Number of farms and land in farms, United States, June 1, 1981-88

Year	Number of farms	Acres of land in farms	Average size of farms
	Thousands	Thousands	Acres
1981	2,434	1,034,190	425
1982	2,401	1,027,795	428
1983	2,370	1,024,195	432
1984	2,328	1,019,378	438
1985	2,275	1,014,383	446
1986	2,212	1,007,634	456
1987	2,176	1,002,603	461
1988[1]	2,159	998,692	463

[1] Preliminary.

Table 14.—Percent of farms, land in farms, and average size, by economic class, United States, June 1, 1987-88

Economic class gross value of sales	Percent of total				Average size of farms	
	Farms		Land			
	1987	1988	1987	1988	1987	1988
	Percent				Acres	
\$ 1,000-\$ 2,499	27.1	24.5	4.6	3.5	78	66
\$ 2,500-\$ 4,999	14.8	14.7	4.0	3.3	125	104
\$ 5,000-\$ 9,999	12.8	12.1	5.4	4.9	194	177
\$ 10,000-\$ 19,999	9.8	10.4	6.7	6.5	315	289
\$ 20,000-\$ 39,999	9.5	10.5	11.0	11.3	533	498
\$ 40,000-\$ 99,999	12.8	13.3	23.0	19.1	828	664
\$100,000-\$249,999	9.3	10.2	25.8	27.1	1,278	1,229
\$250,000+	3.9	4.3	19.5	24.3	2,304	2,614
Total	100.0	100.0	100.0	100.0	461	463

Farms selling \$40,000 to \$99,999 worth of agricultural products in 1986—12.8 percent of all farms—received 10.4 percent of 1986 net farm income. The proportion of farms with annual sales between \$40,000 and \$100,000 was stable between 1986 and 1987.

Farms with sales of \$20,000 to \$39,999 made up 9.5 percent of all farms in 1987 and had average net farm income of \$4,894 in 1986.

These top sales classes accounted for \$152.14 billion in cash receipts (including direct Government payments) of the \$162.81 billion for all farms in 1986. The top sales groups comprised 36 percent of all farms and accounted for 93.4 percent of the cash receipts in 1986.

The number of such farms has almost tripled from 1960 to 1987.

Meanwhile, farms grossing less than $20,000 in yearly sales declined by over 60 percent during the same 1960-87 period.

More recently, the proportion of farms in the $10,000 to $39,999 range has remained stable, although the percentage of small farms, those with sales less than $10,000, increased. The small farms still account for only 14 percent of total land in farms. In contrast, the farms with sales over $100,000 account for nearly half of the total farmland.

The average size of small farms increased slightly in 1987. Farms with sales from $10,000 to $39,999 also increased in size, as did those with sales between $40,000 and $100,000. Farms with sales greater than $100,000, on the average, decreased in size.

15. FAMILY-CONTROLLED FARMING

A family-controlled farm business is much like any other business in which an individual or several members of a family own part or all of the assets and make most of the business decisions. Unlike the business organizations in which management is hired by stockholders, most farm businesses are closely held; ownership and management are not separated.

Family businesses, whether engaged in farming or some other business activity, can be organized in three different ways. The most common is the sole proprietorship. In this form of business organization, an individual or a married couple is responsible for operating the business. Of all farms reported in the 1982 Census of Agriculture, 87 percent were sole proprietorships.

The partnership is the next most important form of business organization for farm businesses. About 10 percent of the farms were such businesses. Typically, partnerships include a parent and one or more children or other close relatives. Each member of the partnership shares in earnings or losses in proportion to his or her contribution. Farm businesses organized as partnerships tend to be larger than sole proprietorships because the resources of several individuals can be combined, and additional labor and management are provided by the partners.

The third form of business organization is the corporation, which has a legal identity apart from its shareholders. Any business can be incorporated under the laws of the State in which the organizers choose to file articles of incorporation.

Because it is a separate legal entity, it can conduct business in the name of the firm, provide limited liability to its stockholders, and continue to exist even though one or more shareholders may die. Shares in the business may be transferred by sale or gift, and a different set of tax laws applies than the laws for sole proprietorships and partnerships. According to the 1982 Census of Agriculture, there were 59,788 farms operated by corporations. These accounted for about 3 percent of all farms.

Most farming corporations reported in the census (52,657) were held by families, meaning that the majority of stock is held by members of a single family or close relatives.

The remainder (7,131) of corporate farms were nonfamily corporations. The stock of most of these nonfamily corporate farms is closely held by small groups of nonrelated persons, but the stock of some of them is widely held and traded on the over-the-counter market or on organized stock exchanges. A few of the nonfamily corporate farms are owned by nonfarm corporations. Sales of these nonfamily corporate farms came mostly from fed cattle, poultry, and fruits and vegetables.

16. LAND TENURE

Land tenure describes the relationship of the farm operator to the land operated. The major land tenure categories in this country are (1) full owners, who own all of the land they operate; (2) part owners, who own and rent land they operate; and (3) tenants, who rent all of the land they operate.

The Census of Agriculture reports that in 1982 approximately 2,241,000 farmers worked about 985 million acres of land in farms. Full owners (55.1 percent of all farm operators) operated 342.6 million acres.

Part owners (29.3 percent of all farm operators) worked 528.9 million acres.

Tenant operators (11.6 percent of all farm operators) operated about 113.3 million acres.

The number of farm operators has been declining since it peaked at 6,812,000 in 1935. This trend is continuing, but the decline in recent years does not appear to be as precipitous as in earlier years. Part owners are becoming more important as a tenure class as measured by an increasing proportion of the number of farms, acres in farms, and value of products sold. Despite a considerable decline in the number of farms and shifting proportions among the tenure classes, farm operators as a whole own about three-fifths and rent about two-fifths of the land they handle.

Rental agreements vary widely, but two types are readily identified: cash leases and share leases. Under cash leasing, the most common variation is for a fixed cash payment from the tenant to the landowner for the use of the land. Typically, most farming decisions are then made by the tenant.

Share leases, which may involve crops, livestock, or both, are more numerous than cash leases, and like cash leases, may be quite flexible. Tenants combine their assets (labor and capital) with the landowners' assets (land and capital) to produce a product that is shared to compensate for the contribution each makes. The share each receives varies considerably, based on the product grown, quality of the respective assets, local custom, and so on. Variable costs of production often are shared in the same proportion as output.

Under crop-share arrangements, the landowner typically pays for one-third or one-half of the seed, fertilizer, and certain other production expenses, and receives a corresponding share of the crops. The landowner also pays the real estate taxes, maintains buildings, and pays for permanent improvements to the land. The renter may also pay cash rent for hay or pastureland, or for the use of buildings, in addition to a share of the crops.

Under cash rental, the renter pays a fixed dollar amount per acre or for the entire tract of farmland, pays for all operating expenses, and keeps all the crops and livestock he or she produces. The landowner pays the real estate taxes and keeps up the buildings.

Under the livestock-share rental arrangements, the landowner and tenant jointly own certain classes of livestock and the machinery that is directly associated with the livestock enterprise, and share operating expenses and net income, most frequently on a 50-50 basis.

17. FARMLAND OWNERSHIP

The 1982 Census of Agriculture reported that of the 2,239,300 farm operators, 1,988,602 owned 597.7 million of the 932.1 million acres of land in farms.

Of the 377.1 million acres of rented land in farms, 11 percent was owned by farm operators, and 89 percent was owned by nonoperator owners. Thus nonfarmers hold about 36 percent of all land in farms.

Results of a survey of landowners in 1978 indicate that over 84 percent of the farmland was owned by sole proprietors, husbands and wives, or family partnerships. About 11 percent was held by corporations, two thirds of which were family corporations.

Persons identifying themselves as farmers owned 57 percent of the noncorporate farmland; retired people, 17 percent; white collar workers, 14 percent; and blue collar workers, 8 percent.

Farmland ownership was concentrated in the hands of older people. Just under 30 percent was held by persons over 65, and only 6 percent by persons under 35. Owners of over 10 percent of the acreage were over 75.

Farmland owners were overwhelmingly male. Owners of 85 percent of the noncorporate land were identified as male. However, this does not fully recognize female participation in ownership through husband-wife holdings and family partnerships.

Ninety-four percent of owners, holding 98 percent of noncorporate farmland, identified themselves as white and non-Hispanic. Blacks and Hispanics each held less than 1 percent of the farmland, with other minority groups holding even smaller proportions.

The level of formal education was not a major factor in farmland ownership. The proportion of land held by people with only a grade school education was the same as that held by college graduates—20 percent each.

About one-third of the land was held by people with only high school educations.

Owners of over three-quarters of all farmland lived or had corporate headquarters in the same county as the land owned. Only 6 percent was held by out-of-State residents.

Ownership of farmland is concentrated. The largest 0.7 percent of owners held 26 percent of the acreage. Concentration does not appear to have increased significantly over the period covered by farm ownership surveys since 1946.

Foreign persons, including corporations, partnerships, and other legal entities, are required under the Agricultural Foreign Investment Disclosure Act to report their holdings of U.S. agricultural land.

Summarization of the report under the act confirms that at the end of 1987, slightly less than 1 percent of the farmland was - owned by foreigners. Forest land accounts for 50 percent of this foreign-owned acreage. Although some local areas may be noticeably affected by foreign ownership, the total quantity is so small nationally that the aggregate effect is insignificant.

18. CONTRACT FARMING AND VERTICAL INTEGRATION

A contract to produce and deliver a farm commodity is basically similar to the contractual arrangements that are widely used in industry.

One firm—in this case, a farmer—agrees to plant, care for, and deliver the production from a given acreage of peas to the canning plant. Or the producer agrees to care for a specified number of broilers, hens, or turkeys and turn over the birds or eggs to the processing or marketing firm.

The contractor may specify the variety of seed to be used, the particular strain of broilers or laying hens, the kind of fertilizer or feed to be used, and other specific practices the producer must follow.

The contractor may go even further and provide all the inputs needed and assure the producer a guaranteed minimum for operator labor and use of buildings and equipment.

Contracts involving farm products can range all the way from the preceding type of contract to one in which the farmer simply agrees in advance to sell a certain amount of a product to a particular buyer. The price may be determined in advance or it may be based upon a formula that takes into account the going market price at the time of delivery.

A high percentage of the production of broilers, eggs, turkeys, sugar beets, fruits, and vegetables has long been involved in various kinds of contractual arrangements.

In recent years the technique has been applied to cattle feeding, hog production, and certain feed crops and forage. Commercial feedlots will feed out the calves raised by cattle farmers; a feed manufacturer will make contracts with local farmers to produce feeder pigs or to raise market hogs.

Commercial feedlots often contract with nearby farmers to raise forage needed in the feedlot or to deliver feed grains on a regular schedule.

Each party to a contract is seeking some advantage in the arrangement. The producer often receives technical advice, financing for the production period, and is assured a market outlet. The contractor hopes to get a product that better meets the contractor's requirements for processing and marketing and that is delivered on a schedule that will permit more efficient use of the contractor's plant and labor.

Vertical integration is an alternative to contracts. It is used by input suppliers and processors to achieve control of two or more stages in the production and processing of food products.

Broiler processing firms that own hatcheries and feed mills and that engage in direct production (rather than production by contracts) are prime examples of a vertically integrated food system.

Canning companies that produce a portion of their crop requirements and cattle feeders that also own slaughter plants are other common examples.

Overall, the extent of contract production and vertical integration increased substantially between 1970 and 1980. About 22 percent of total farm production in 1970 was estimated to have been conducted under both forms of coordination, and the proportion increased to about 30 percent by 1980. Contract production increased from 17 to 23 percent and vertical integration from about 5 to 7 percent.

Sharpest increases in both contracting and vertical integration occurred for eggs and turkeys in the livestock sector, and in contracting for cotton, grains, oilseeds, and citrus and noncitrus fruits.

The major change in contract farming since 1970 has been a sharp increase in farmers' use of forward sales contracts in marketing cash grains, oilseeds, and cotton.

19. RISE OF U.S. PRODUCTION

Farmers in the United States produce 3.3 times more per work-hour than in 1960 and over 7.7 times as much as in 1947.

Although large acreages were held out of crop production between 1960 and 1970, total U.S. farm output increased nearly as fast as U.S. population. During most of the 1970's, acreage was restored to production and output increased even faster than during the 1960's.

In the 1980's, cropland used for crops has stabilized somewhat, reaching about 372 million acres in 1985, compared with about 332 million in 1970.

An annual increase in farm production has come to be taken for granted, but in the early decades of this century farm production was almost on a treadmill.

Agricultural production in the United States rose by 1 percent per year from 1910 to 1930. It rose an average of 1.6 percent annually in the 1930's, 2.2 percent in the 1940's, 2.3 percent in the 1950's, 1.1 percent in the 1960's; and 2.3 percent in the 1970's. From 1980 to the record production realized in 1985, it has had an average annual increase of close to 3.0 percent.

USDA's Forest Service has calculated timber productivity. It found that the productivity of the Nation's softwood timber resources, as measured according to recently developed indexes, continues to improve. Additional details are in Chapter 54 on Forest Management.

Table 15.—Agricultural productivity

Year	U.S. population (July 1) (millions)	Index of total farm output (1977 = 100)	Index of* output per work hour (1977 = 100	Crops harvested (million) acres)
1930	[1]123.1	43	NA	369
1940	[1]132.1	50	NA	341
1950	151.7	61	22	345
1955	165.3	69	30	340
1960	180.8	76	42	324
1965	194.4	82	56	298
1970	205.1	84	74	293
1975	216.0	95	90	336
1976	218.0	97	97	337
1977	220.2	100	100	345
1978	222.6	104	104	338
1979	225.1	111	113	348
1980	227.8	104	109	352
1981	230.1	118	123	366
1982	232.5	116	125	362
1983	234.8	96	99	306
1984	237.0	112	121	348
1985	239.3	118	139	342
1986	241.6	111	139	325
1987	243.8	[2]109	[2]140	302

[1] Includes 50 States.

[2] Estimated

*Revisions made last year in the labor input series produced extensive changes to the indexes for labor and total output per work hour.

III. INTERNATIONAL AGRICULTURAL TRADE AND AID

20. FOREIGN TRADE (EXPORTS)

The United States has remained the world's top exporter of agricultural products despite the setbacks experienced during the 1980's: world debt problems, a fluctuating dollar, and increased foreign competition. The U.S. market share of world trade during fiscal years 1987 and 1988 averaged about 12 percent.

The export market remains vital to U.S. agriculture. Domestic demand cannot absorb all the surplus production that results from a sharp decline in exports. The surplus is forced to enter stocks—private- or government-owned. Prices ordinarily fall in such cases.

In calendar 1987, the output from nearly 35 percent of harvested acreage was exported compared with 30 percent in previous years. In 1988, 18 percent of agricultural production, measured in dollars, was exported, compared with 24 percent in the peak year 1981.

Total U.S. agricultural exports increased by $7.3 billion in fiscal year 1988 (October 1987 - September 1988) to $35.3 billion. This is 27 percent more than the previous year, but 19 percent below the record of $43.8 billion set in fiscal 1981.

Exports of high-value products during fiscal 1988 surpassed the previous year's sales by 18 percent and broke the previous record of $15.3 billion set in 1981, climbing to $16.4 billion.

Export value was buoyed by strong demand and higher prices for U.S. livestock and horticultural products. The export of these products continued to benefit from the appreciation of foreign currencies in developed markets and export promotion activities under the Targeted Export Assistance (TEA) Program.

The primary bulk commodities—wheat, corn, soybeans, cotton, tobacco, and rice—made a remarkable recovery as a whole but with mixed moves individually. Wheat, corn, and cotton increased 42, 11, and 15 percent respectively, while soybeans, rice, and tobacco declined in volume.

Wheat exports as a share of production rose from 38 percent in 1985-86 (Note: Export share figures are on a crop-year basis; fiscal years refer to October 1 through September 30.) to an estimated 75 percent in 1987. Corn producers relied primarily on the domestic market with only 25 percent of production exported in 1987. Soybeans have not had the imbalance between production and exports to the same degree as wheat and corn because soybeans can be exported as beans, meal, or oil, giving the importer greater flexibility.

About 56 percent of U.S. soybean output (soybean and meal equivalent) was exported in 1988. The value of wheat and flour exports totaled $4.6 billion in fiscal 1988, up 50 percent over 1987.

Coarse grain exports increased nearly 39 percent to $5.2 billion in fiscal year 1988, while export sales of soybeans and products (meal and oil) rose to $6.9 billion, 20 percent above last year.

U.S. government programs have improved U.S. exports in recent years. Commodity registrations under the Commodity Credit Corporation's (CCC) GSM-102 and GSM-103 Export Credit Guarantee Program totaled $4.5 billion in fiscal 1988, up 55 percent from fiscal 1987.

Sales under the Export Enhancement Program (EEP) were $3.3 billion and direct sales of CCC-owned stocks totaled $109 million. Food aid under Public Law 480 totaled $1.2 billion and Section 416 donations totaled another $194 million. Exports under these programs totaled about $8.3 billion and represent about 24 percent of total U.S. exports in fiscal 1988, up from 19 percent from fiscal 1987.

The United States exports to some 170 countries worldwide. In fiscal 1988, 58 percent of U.S. exports, amounting to $20 billion, went to just 10 countries. They were, in descending order of sales value: Japan, South Korea, Netherlands, Canada, the Soviet Union, Mexico, Taiwan, West Germany, Spain, and the United Kingdom.

Regionally, Asia, with $14 billion in U.S. agricultural imports, was our largest market, followed by Western Europe ($8 billion), Latin America ($4.4 billion), Africa ($2.3 billion), Canada ($2 billion), the Soviet Union ($1.9 billion), Eastern Europe ($559 million), and Oceania ($238 million).

21. TRADE BLOCS

Over the past two decades, regional economic organizations—trade blocs—have had a significant impact on world trade in agricultural and industrial products.

Regional economic organizations are defined as free trade areas, customs unions, or common markets. Two or more countries that form a free trade area agree to eliminate tariffs on products that originate in their territories. Each member of the free trade area, however, maintains its own tariff schedule for imports from nonmembers.

A free trade area becomes a customs union or common market when the members agree to maintain a common external tariff on imports from nonmembers. In addition, there may be an effort to remove all internal barriers to permit the free flow of labor, capital, goods, and services (even energy).

The European Community (EC), originally composed of Belgium, France, West Germany, Italy, Luxembourg, and the Netherlands, and later joined by the United Kingdom, Denmark, and Ireland in 1973, Greece in 1981, and Spain and Portugal in 1986, is an example of such a common market.

The EC was formed in 1957. By 1968, tariffs among the six original member countries had been eliminated. Today, a common external tariff applies to imports from outside countries. A common agricultural policy covering nearly all farm commodities has eliminated differences in national agricultural policies and attempted to attenuate agricultural price differences.

The influence of the EC now extends far beyond the boundaries of the current 12 members. Sixty-five African, Caribbean, and Pacific countries, nearly all of which are former colonies or trust territories of EC countries, have been granted special trade and aid benefits by the EC. Most Mediterranean countries have preferential trade agreements with the EC.

The European Free Trade Association (EFTA), established in 1960, was originally formed as a temporary organization, an alternative to a wide European market. Its seven original members included Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the United Kingdom (Great Britain and Northern Ireland). Finland joined EFTA as an associate member in 1961; Iceland became a full member in 1970.

The importance of EFTA as a trade bloc has diminished since the United Kingdom, Denmark, and Ireland joined the EC in 1973. Portugal also was obliged to leave EFTA since joining the EC.

The United States and Israel concluded a free trade agreement in early 1985, which will progressively eliminate all tariffs over 10 years. The most sensitive agricultural products, such as processed tomato products and citrus juices, will not start the tariff reduction process until 1991.

In 1949, Eastern bloc nations (except East Germany) formed the Council for Mutual Economic Assistance (CMEA). Later and separately East Germany, Mongolia, Cuba, and Vietnam joined, and Albania dropped out. Yugoslavia and Nicaragua are observer members of CMEA. Finland has a special cooperation agreement with CMEA.

The purpose of CMEA is to improve trade and economic coordination among members according to "basic principles for the international socialist division of labor." More than half the foreign trade of member countries is with other CMEA countries and is governed by long-term agreements.

Since this trade is valued in nonconvertible units of exchange and prices are distorted by subsidies, CMEA's influence on world trade is hard to gauge. Though many members have expressed eagerness to trade more with nations that are not CMEA members, their prior obligations to CMEA have often prevented them from doing so.

In the Western Hemisphere, three major economic groups have emerged: The Latin American Integration Association (LAIA)—formerly the Latin American Free Trade Association or LAFTA—established in 1960; the Central American Common Market (CACM), formed in 1961; and the Caribbean Common Market (CARICOM), established in 1973. The provisions of their association are not as broad as those of some of the other regional economic organizations.

Members of LAIA include Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela.

Five members of LAIA, the 'Andean Group' of Bolivia, Colombia, Ecuador, Peru, and Venezuela, also have established the Andean Common Market (ANCOM).

The members of the Central American Common Market (CACM) are Guatemala, El Salvador, Honduras, Nicaragua, and Costa Rica. CACM is plagued by many problems. Tensions have been provoked by intercountry disputes as well as internal problems of the members.

The members of CARICOM include the following 13 former British Caribbean dependencies: Jamaica, Trinidad and Tobago, Barbados, Guyana, Antigua, St. Kitts-Nevis, Montserrat, Dominica, St. Lucia, St. Vincent, Grenada, Belize, and the Bahamas.

The United States-Canada Free Trade Agreement was concluded in late 1988 and went into effect on January 1, 1989. The agreement falls short of establishing a free trade area but removes numerous trade barriers and expands market access between the two countries for many goods and services. All tariffs, including agricultural products, will be phased out over a 10-year period. Although the agreement does not cover many sensitive bilateral agricultural issues, it does liberalize quantitative restrictions on trade in grains, beef, poultry, and sugar products.

The Association of Southeast Asian Nations (ASEAN) was established in 1967 to foster closer diplomatic and economic cooperation among its members. Its members are the

Philippines, Malaysia, Indonesia, Thailand, Singapore, and Brunei. While ASEAN has been fairly successful in attaining its diplomatic goals by presenting a united front, it has been much less successful in creating economic integration among its members.

22. EXPORT MARKET SERVICES

Holding and expanding the U.S. share in world markets, which provide an outlet for the production of nearly 30 percent of harvested crop acres, is crucial to U.S. farm incomes and important to the entire economy.

Today about one-fourth of net farm income comes from overseas sales. Moreover, farm exports sustain about a million U.S. jobs, strengthen the dollar, cut tax costs for farm programs, and stimulate production of food for the benefit of all consumers.

To maintain and expand the level of exports requires a vigorous export market development program.

The Department's Foreign Agricultural Service (FAS) promotes commercial exports by conducting a market development program abroad in cooperation with agricultural export trade associations that represent a wide variety of U.S. commodities.

FAS works with 48 of these associations—known as cooperators. In addition, FAS works with four regional State groups and the National Association of State Departments of Agriculture, which collectively represent virtually every State.

Cooperator activities are carried out under contractual agreements with the Department. Promotional activities are proposed in annual marketing plans developed by the cooperator and submitted to USDA for approval.

The cooperator program uses two basic approaches to market promotion. One of them is trade servicing, which means helping the buyer choose the right U.S. product and use it efficiently. Trade servicing is usually used to encourage sales of bulk, unprocessed commodities such as soybeans and feed grains. The other method is direct consumer promotion, used by cooperator and State groups representing producers of semiprocessed and consumer products.

The Targeted Export Assistance Program (TEA), Section 1124 of the Food Security Act of 1985, as amended, provides that for each of the fiscal years 1986 through 1988, the Secretary of Agriculture shall use not less than $110 million on commodities owned by CCC for activities authorized by the Secretary to counter or offset the adverse effect on the export of a U.S. agricultural commodity or the product thereof of a subsidy, import quota, or other unfair foreign trade practice.

For each of the fiscal years 1989 and 1990, the minimum dollar amount of funds or commodities required to be used for such purposes increases to not less than $170 million and may increase to $200 million.

Priority for such export assistance is to be provided for agricultural commodities or products with respect to which there has been a favorable decision under Section 301 of the Trade Act of 1974, or for which exports have been adversely affected by retaliatory actions related to a favorable 301 decision.

Currently, the TEA program is being funded entirely through issuance of CCC generic commodity certificates, rather than through payment of CCC funds. Targeted export assistance is being provided through program agreements with U.S. trade associations, State-sponsored organizations, or private firms to conduct specific market development projects for eligible commodities in specified countries.

Two basic programs operate under the auspices of the TEA program: A generic promotional program with nonprofit agricultural associations and State organizations (TEA) and a brand-identified or high-value promotional program with private U.S. firms (TEA/EIP).

FAS sponsors overseas trade shows featuring U.S. food products, instore promotions of U.S. foods, and U.S. sales team visits to foreign buyers. FAS also maintains an Agricultural Information and Marketing Service (AIMS) staff within the agency's High Value Products Division. The AIMS export expansion program seeks to assist U.S. companies in introducing their products to foreign markets through a combination of market and trade information as well as computer-based export marketing services.

FAS also has an Export Product Review (EPR) service for U.S. sellers of high-value, brand-oriented, processed food products. The EPR program is fee-based and is designed to provide exporters of prepackaged food products with advance information on a targeted foreign country's labeling regulations, food additives/ingredient restrictions, product standards, etc.

FAS also maintains trade offices throughout the world to provide more direct service to foreign export markets in major or emerging trade areas. Trade offices are located in Seoul, Korea; Tokyo, Japan; London, England; Hamburg, West Germany; Manama, Bahrain; Singapore; Bagdhad, Iraq; Caracas, Venezuela; Lagos, Nigeria; Tunis, Tunisia; Beijing and Guangzhou, China; Algiers, Algeria; Istanbul, Turkey: and Jidda, Saudi Arabia.

The Public Law 480 program, titles I, II, and III (also called the

Food for Peace Program), and the Commodity Credit Corporation (CCC) Export Financing Programs allow FAS to provide both concessional and commercial financing of U.S. agricultural exports to maintain and expand overseas markets.

P.L. 480 provides direct food donations and promotes long-term improvement in the economies of developing countries.

Title I (the concessional sales part of P.L. 480) provides for financing sales of U.S. agricultural commodities on low-interest, long-term credit.

Title II is the direct food donations part of the program.

Title III, known as the Food for Development Program, allows foreign governments to buy U.S. agricultural commodities on title I terms on a multiyear basis and resell these commodities in their own countries. Proceeds from these sales, or the commodities themselves, are used for specific self-help projects. As the currencies are used, an equivalent dollar value to the title I debt is offset or forgiven.

The 1985 Farm Bill authorized two new activities under the authority of the P.L. 480 program: The Food for Progress and Local Currency Initiative Programs.

Food for Progress agreements may use the authority of P.L. 480 or section 416. The program provides at least 75,000 metric tons of agricultural commodities for needy countries, mainly in Africa, to encourage agricultural reform. Agreements have been signed with Madagascar, Guinea, and Equador, which will receive 60,000 tons of rice under section 416 authority.

The goal of the Local Currency Initiative Program is to generate economic growth via the private sector in recipient countries. To achieve this goal, sales of U.S. products for local currency were reinstated. These local currencies will be owned by the U.S. Government and loaned to private financial intermediaries in the title I countries.

These financial intermediaries will relend the local currencies to local private businesses to encourage economic growth. Agreements were signed in fiscal 1988 with Costa Rica, Dominican Republic, Guatemala, Jamaica, Sri Lanka, and Tunisia.

The CCC Export Credit Guarantee Program (GSM-102) is particularly helpful in opening new markets, preserving or increasing the U.S. share of existing markets, or preventing a decline in the share or loss of a U.S. market. It has been a valuable tool in assisting developing countries in their transition from purchasing under concessional and aid-type programs to making commercial purchases. Its usefulness as a financing tool is dependent upon the particular economic environment in the importing country as well as the price competitiveness of the U.S. commodity.

An additional Commercial Export Credit Guarantee Program (GSM-103) was authorized by the 1985 Farm Bill. This program permits 3- to 10-year loans designed to help developing nations make the transition from concessional financing to cash purchases. The GSM-103 program includes primarily breeder livestock and growers.

The GSM 102 and GSM 103 programs provide credit guarantees to protect the U.S. exporter or the exporter's assignee against both commercial and noncommercial (political risk) defaults. This is accomplished under a foreign bank letter of credit for export financing of U.S. agricultural commodities on a deferred payment basis for periods ranging from 6 months to 10 years.

In May 1985, the Secretary of Agriculture announced implementation of an export enhancement program. The program's major objectives are to expand U.S. agricultural exports and to encourage U.S. trading partners to begin serious negotiation on agricultural trade problems.

The program offers government-owned commodities as bonuses to exporters to expand sales in targeted export markets. Competitive bids are offered to the Commodity Credit Corporation (CCC) by exporters to obtain the bonus commodities. The value of agricultural commodities exported under this program during fiscal years 1985-88 totaled over $5.5 billion.

Initiatives under the program must satisfy four criteria:

(1) Additionality—Sales must increase U.S. agricultural exports above what would have occurred in the absence of the program;

(2) Targeting—Sales will be targeted on specific market opportunities, especially those that challenge competitors that subsidize their exports;

(3) Cost effectiveness—Sales should result in a net plus to the overall economy, and

(4) Budget neutrality—Sales should not increase budget outlays beyond what would have occurred in the absence of the program.

23. FUTURE MARKETS ABROAD FOR WORLD TRADE EXPANSION

The U.S. agricultural community is beginning to look increasingly toward developing countries as its potentially largest future markets for agricultural exports.

Three-fourths of the world's population lives in the "Third World," an area where rapid population growth is projected for coming years. Because the demand for food supplies increases in direct proportion to population growth, one might easily but mistakenly assume that this circumstance alone would create a potentially thriving market for U.S. agricultural goods.

But many people in less developed countries live in poverty, with the poorest of the poor earning less than $400 per capita annually. They lack the means to purchase adequate food and fiber, which results in chronic hunger and malnutrition, with little improvement seen for future generations.

So it is not hunger or rapid population growth that make countries better customers for U.S. farm producers. Rather, it is increased purchasing power resulting from their growing wealth and improved standards of living. People's standard of living rises when they improve their economic condition, in turn allowing them to buy needed goods and services.

Agriculture remains the main source of income for most people living in less developed countries.

USDA, through its Office of International Cooperation and Development (OICD), works closely with the U.S. Agency for International Development (AID) and other donor organizations to implement technical assistance and training activities which help build the infrastructure and human resources needed by developing countries to achieve self-reliance, while at the same time ensuring future world food supplies.

Technology transfer from the United States to developing countries, managed by OICD and utilizing the expertise of the entire U.S. agricultural community—universities and other USDA subject matter agencies included—provides the latter with modern techniques they can use in developing successful agricultural strategies. Such transfer involves animal and plant disease control; soil and water conservation; management of public forests and rangelands, including wildfire suppression and prevention; economic analysis and forecasting; and information and marketing services.

Programs do not benefit major competitor nations, and requests for technical assistance from these nations are not entertained.

Education plays a powerful role in development efforts. In 1987, more than 2,300 people from over 100 countries were trained in the agricultural sciences through OICD.

USDA's 30-year record of assisting developing nations with academic and on-the-job training, observational tours, and technical training clearly shows a U.S. commitment to global development.

A vital agribusiness sector spurs trade and investment opportunities, and promotes economic development in developing countries as well as in the United States.

Programs like the U.S. Caribbean Basin Initiative, which is supported by OICD's Private Sector Relations Division, stimulate U.S. entrepreneurial interest in agricultural trade and investment opportunities.

Duty-free access of nontraditional and/or off-season products from the Caribbean Basin, such as fresh fruits and vegetables and ornamental plants, provides a strong incentive for U.S. agribusinesses to consider joint ventures with Caribbean Basin partners.

Scientific cooperation through OICD-arranged team exchanges and collaborative research with other countries enables the United States to share agricultural data and collect exotic germplasm and biological materials.

A unique feature of the cooperation between U.S. and foreign scientists is that it involves scientific work that could not be done in the United States, yet it directly benefits U.S. citizens.

For example, exchanges between the United States and the People's Republic of China have led to the fighting of citrus disease by developing new citrus strains and processing citrus more efficiently. The biological control of gypsy moth infestation with natural predators has also been helped by the China program. U.S. scientists recently obtained important lines of soybean and peanut germplasm from China which will be useful to U.S. breeding programs.

Long-term field research by U.S. scientists in other countries on acid precipitation, disease-resistant germplasm, integrated pest management, and Africanized bees provides access to new information and expertise to the U.S. agricultural community.

Keeping U.S. policy views on the record, USDA also presents the concerns of U.S. agriculture in dealings with international organizations working in the areas of agriculture and rural development, such as the World Food Program, and development banks like the World Bank.

Keeping U.S. positions on agricultural issues in the mainstream of discussions by these organizations and promoting goodwill globally is another job of the Office of International Cooperation and Development (OICD).

24. U.S. RESPONSE TO WORLD HUNGER

The United States is the world's largest food donor. It has provided more food assistance to developing countries than all other nations combined—more than $40 billion in commodities since the passage of Public Law 480 in 1954.

P.L. 480, formally known as the Agricultural Trade Development and Assistance Act of 1954, or the Food for Peace Program, has been the major U.S. Government tool for providing food aid for more than 30 years.

In fiscal year 1988, the United States exported an estimated $1.1 billion under the Food for Peace Program.

During that year, the United States authorized, through Title II of the P.L. 480 program, 1.9 million metric tons (on a grain-equivalent basis) of food commodities valued at $458 million to go to malnourished people in 84 countries. The recipients of the three largest amounts of emergency food aid were Ethiopia, Mozambique, and Sudan.

The international technical assistance, training, and scientific exchange and research programs described in the preceding chapter also are a major U.S. response to world hunger. Through these efforts the United States is helping build the infrastructure and create economic development which can lead to long-term solutions to hunger problems.

25. FOREIGN TRADE (IMPORTS)

The United States was among the world's largest importers of agricultural products in 1986. The other major importers were West Germany, Japan, the United Kingdom, the Soviet Union, Italy, and France.

U.S. agricultural imports totaled $20.5 billion in fiscal year 1988. Of this amount, imports of supplementary (partially competitive) products such as meats, fruits, vegetables, and sugar were a record $14.2 billion. Imports of complementary or noncompetitive products such as coffee, cocoa, and rubber totaled $6.3 billion. Nearly all complementary items are duty free.

The United States imports agricultural commodities from more than 155 countries. In fiscal 1988, 55 percent of the value of total agricultural imports came from only 10 countries.

They were, in descending order: Canada, Mexico, Brazil, Australia, Colombia, New Zealand, France, Indonesia, The Netherlands, and Denmark.

26. BALANCE OF PAYMENTS

A statement of economic transactions involving the exchange of goods, services, and capital claims between a country and foreign countries is called a "balance of payments."

People in the United States pay people in other countries for imported goods and services. Money also is transferred to foreign countries for economic and military assistance, for investment, private remittances, pensions, and other purposes.

The United States also receives money from other countries, mainly in payment for exports and services, mutual defense, investment, and repayments on U.S. Government and commercial loans.

When the outflow of money is greater than the incoming money, a trade deficit occurs. When the amount of incoming money exceeds the outflow, a trade surplus is said to have accumulated.

Agricultural exports give the United States substantial balance of payments help. During fiscal years 1960 through 1988, commercial exports of U.S. farm products brought $548 billion back to the United States. In fiscal 1988 alone, commercial farm exports totaled $34.0 billion. Exports under Government programs such as Public Law 480 (Food for Peace) totaled over $36 billion for the 29-year period; in 1988 alone, exports under these programs amounted to about $1.5 billion.

The aggregate net contribution of agricultural exports to the U.S. balance of payments for 1960 through 1987 was $238 billion. The contribution in 1987 alone was more than $13 billion.

IV. FOOD MARKETING, PROTECTION, AND DISTRIBUTION

27. COST OF FOOD SERVICES AND DISTRIBUTION

The estimated bill for marketing domestic farm foods—which does not include imported foods—was $283 billion in 1987. This covered all charges for transporting, processing, and distributing foods that originated on U.S. farms. It represented 75 percent of the $377 billion consumers spent for these foods. The remaining $94 billion represented the payment, or gross return, that farmers received.

The cost of marketing farm foods has increased considerably over the years, mostly because of rising costs of labor, transportation, food packaging materials, and other inputs used in marketing, and also because of the growing volume of food and increase in services provided with the food.

In 1977, the cost of marketing farm foods amounted to $133 billion. In the decade after that the cost of marketing rose about 113 percent. In 1986, the marketing bill rose 5 percent.

These rising costs have been the principal factor affecting the rise in consumer food expenditures. From 1977 to 1987, consumer expenditures for farm foods rose $186 billion. Over four-fifths of this increase resulted from an increase in the marketing bill.

The cost of labor is the biggest part of the total food marketing bill. Labor used by assemblers, manufacturers, wholesalers, retailers, and eating places cost $131 billion in 1987. This was 5 percent more than in 1986 and 124 percent more than in 1977.

Labor costs have risen more slowly in recent years, because of smaller increases in wages and salaries. Improvements in output per work-hour, or productivity, have slowed significantly since 1977 and offset a very small part of the rise in hourly earnings of food marketing employees.

The total number of food marketing workers in 1987 was about 13 million, over 50 percent more than a decade ago. The growth in employment, however, was largely confined to public eating places.

28. FOOD EXPENDITURES AND PRICES

Total food expenditures, which include imports, fishery products, and food originating on farms, were $448.5 billion in

1987, an increase of 5.3 percent over those in 1986. The average was $1,856 per capita, 4.3 percent above the 1986 average.

Food expenditures rose 5 percent, while disposable income increased 5.2 percent from 1986 to 1987. Retail food prices (including meals served in restaurants) rose 73.3 percent during the last 10 years (1977-87). Prices of food eaten away from home increased 86.9 percent, while retail foodstore prices increased 67.5 percent.

Prices of goods and services, excluding food, in the Consumer Price Index climbed 90.6 percent during the 10 years. Transportation was up 78.8 percent; housing, 98.9 percent; medical care, 128.4 percent; and apparel and upkeep, 40.7 percent.

29. FARM-RETAIL PRICE SPREAD

Food prices include payments for both the raw farm product and marketing services. In 1986 the farm value, or payment for the raw product, averaged 30 percent of the retail cost of a market basket of U.S. farm foods sold in foodstores. The other 70 percent, the farm-retail price spread, consisted of all processing, transportation, wholesaling, and retailing charges incurred after farm products leave the farm.

Over the past 10 years, the farm-retail spread has risen much more than the farm value; the farm share declined.

Farm-retail spreads have increased every year for the past 10 years, largely reflecting rising costs of labor, packaging, and other inputs. In 1987, farm-retail spreads rose about 6 percent. Farmers received 2.3 percent more for food commodities in 1987 than they did the preceding year. Widening farm-retail spreads continued to push up food costs in 1988. The farm value was expected to rise modestly in 1988.

The share of the food dollar spent in grocery stores represented by the farm value was expected to average about 30 cents in 1988. This share ranged from 30 to 38 percent during the past decade.

The percentage of the retail price accounted for by farm value varies widely among foods, reflecting differences in production and marketing functions. It is larger for animal products than for crop-based foods. Farm value is a relatively small share of the retail selling price of foods that require considerable processing and packaging. The wide variation in the farm value share among major food groups in the farm food market basket is shown in table 16.

Table 16.—Farm value as a percentage of retail price for domestically produced foods, 1977 and 1987

Items	1977	1987
Livestock products:		
Meats	53	47
Dairy	52	44
Poultry	56	45
Eggs	64	54
Crop products:		
Cereal and bakery	12	8
Fresh fruits	29	27
Fresh vegetables	33	31
Processed fruits and vegetables	19	24
Fats and oils	29	18
Market basket, average	38	30

30. PER CAPITA FOOD CONSUMPTION

Per capita food consumption in 1987 rose slightly above the 1986 level. The food consumption index for all foods increased, reflecting greater usage of crop products.

Per capita food consumption increased 6 percent in the decade ending in 1987. The consumption of foods from crops rose 7.13 percent, while that of foods derived from animals increased 2.2 percent.

The increase in consumption of crop-related foods was in fresh fruits and vegetables, ceral products, and vegetable fats. Consumption of dry edible beans and peas also increased.

Among the livestock-related products, consumption of poultry, fish, and dairy products (especially lowfat milk and cheese) was up. Red meat product consumption and egg consumption declined.

31. FOOD PURCHASE PROGRAMS

Each year, through the Agricultural Marketing Service (AMS), USDA buys substantial quantities of food that are donated to schools, needy persons, public institutions, the elderly, and disaster victims.

Donations of food started in the 1930's with programs to help market some of the surplus products farmers couldn't sell and to get the surplus products to people who couldn't afford to buy them. Donations of foods stored under price support programs began in 1949.

Some of the laws that govern USDA food purchases are:

Section 32 of The Agricultural Act of August 24, 1935, as amended, which expands market outlets for agricultural products.

Section 6 of the National School Lunch Act, as amended, which requires the purchase of commodities to supplement food programs to help ensure nutritionally adequate meals for children.

Section 416 of the Agricultural Act of 1949, which authorizes donation of foods from Commodity Credit Corporation (CCC) stocks.

Section 709 of the Food and Agriculture Act of 1965, which authorizes CCC to purchase dairy products at market prices when CCC stocks are not available.

Section 4(a) of the Agriculture and Consumer Protection Act of 1973, as amended, which authorizes funds to maintain the level of donations for domestic assistance programs except for schools without regard to previous restrictions on price. Similar authority for schools is provided under the National School Lunch Act, as amended.

Section 311 of the Older Americans Act of 1965, as amended, which authorizes funds for nutrition programs for the elderly.

During fiscal year 1988, USDA furnished about 2.9 billion pounds of food for distribution in the school lunch and other feeding programs, at a cost of about $2.0 billion.

The Governmentwide Food Quality Assurance (FQA) Staff of AMS's Fruit and Vegetable Division has the responsibility for managing the specifications and coordinating quality assurance work for food purchased by the Federal Government.

FQA's goal is to make sure that the Government buys its food as efficiently and economically as possible. To accomplish this, it gathers and reviews all specifications used by the Government for a single food item; recommends changes to eliminate duplication, reduce complexity, improve clarity of language, and keep specifications current for Government needs.

It also approves final specifications used by all Government agencies and maintains a central file of all specifications used by the Federal Government to buy food.

32. FOOD ASSISTANCE PROGRAMS

USDA's Food and Nutrition Service has several programs which provide food assistance to needy families and children. These programs provided over $20 billion in food aid to low-income Americans in 1987. All programs are operated in cooperation with State and local governments.

The Food Stamp Program helps low-income families improve their diets by providing them with coupons to purchase food at any authorized retail food store. The program was started in 1961 as a pilot project. Food stamps are now available in every county in the United States. Some 19 million people are currently served by the Food Stamp Program at an annual cost of $12.6 billion.

The Food Distribution Program distributes foods acquired under price support, surplus removal, and special purchase programs directly to schools, institutions, disaster relief agencies, summer camps, nutrition programs for the elderly, and needy family programs on Indian reservations.

In addition, millions of low-income people receive free surplus Government commodities donated by USDA and distributed by local agencies and volunteers. The list of available "free" commodities for special distribution now includes butter, flour, cornmeal and cheese.

The Hunger Prevention Act of 1988 extended the Temporary Emergency Food Assistance Program (TEFAP) for 2 years. The Act also authorized an appropriation of $120 million per year for USDA to purchase foods with a high nutrient value for distribution to low-income families through TEFAP. Additionally, the Act authorized USDA to purchase $40 million worth of Federal food for distribution to soup kitchens and shelters for the homeless in the coming year.

The Child Nutrition Programs benefit children from low-income families through school lunches, school breakfasts, and year-round and summer food service programs in nonschool situations such as day care centers and recreation programs. Federal contributions in cash and foods totaled about $5 billion in 1987.

The National School Lunch Program helps participating schools serve meals that meet nutritional standards (set by the Secretary of Agriculture) to children across the country. The meals are federally subsidized, in cash and commodities, so that participating schools can offer free and reduced-price lunches to children of needy families. Approximately 24 million children are served each day at an annual cost of $3.6 billion.

The School Breakfast Program, which is similar to the lunch program, provides nutritious breakfasts to children at school. The program currently serves breakfasts to over 3.5 million children, 89.7 percent of which are eligible for free or reduced-price meals.

The Special Milk Program helps schools and other nonprofit child care institutions not participating in any other federally subsidized meal program make fluid milk available to children. Split-session kindergarten children may participate in this program if they do not have access to a meal program.

The fluid milk helps offset the cost of milk to paying children and provides free milk to those who qualify. The program currently serves an average of 700,000 children daily.

The Child Care Food Program provides food service to needy children in the summer or during extended school vacations. Public or nonprofit private nonresidential institutions or residential summer camps may sponsor the program. This program currently reaches over 1.5 million children.

The Special Supplemental Food Program for Women, Infants, and Children (WIC) provides cash grants to States to make specific supplemental foods and nutrition education available to pregnant, breast-feeding, and postpartum women, and infants and children up to 5 years of age. The program operates in 50 States, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands. It is also operated by 33 Indian tribal organizations. It is currently reaching 3.5 million people.

The Commodity Supplemental Food Program (CSFP) provides a variety of federally purchased foods to supplement the diets of low-income pregnant, breast-feeding or postpartum women, and infants and children under 6 years of age. Currently, the program serves over 133,000 participants up to age 6.

In addition, persons 60 years of age and older can also receive various commodities provided through the CSFP. An average of 81,700 low-income elderly persons were served in fiscal year 1988.

33. HUMAN NUTRITION RESEARCH AND EDUCATION

In the Food and Agriculture Act of 1977, Congress required the U.S. Department of Agriculture to implement the first comprehensive national plan for human nutrition research and education programs.

Increased interest in human nutrition research has resulted from a number of developments, including a growing conviction that proper nutrition is a primary component in preventive health care and that a relationship exists between diet and some of the chronic degenerative diseases in the United States.

Research in human nutrition is defined broadly to include research on specific nutrient requirements and food composition, the relation of diet to disease, food safety, and factors influencing nutritional practices, food choices, and consumption behavior. Research in human nutrition is conducted by two agencies of the U.S. Department of Agriculture: The Human Nutrition Information Service (HNIS) and the Agricultural Research Service (ARS).

HNIS focuses its research on:

- Nutrient Composition of Foods. HNIS compiles information and sponsors research to determine the amounts of about 60 components in the thousands of foods Americans consume. The information is presented in books and in machine-readable forms.
- Nutrition Monitoring. HNIS monitors the dietary status of the population at three levels: U.S. food supply, household food use, and individual food intakes. National surveys provide the household and individual data. Analysis of the data addresses important issues in food assistance and nutrition education.
- Nutrition Education. HNIS coordinates the development of the Dietary Guidelines for Americans, which is published jointly by USDA and the Department of Health and Human Services. Research supports the development and promotion of the Guidelines and other dietary guidance for healthy Americans.

Human nutrition research currently being conducted by ARS focuses on:

- Human Nutrition Requirements. Human requirements for protein, fat, carbohydrates, vitamins, and minerals must still be defined. New methods are being developed for food sampling, analysis, and reporting.
- The Role of Trace Elements. Trace elements such as zinc, nickel, and copper have particular functions in the diet. They include interaction with other dietary components such as fiber, physiological and biochemical influences on minor elements according to age group, and the biological availability of minerals.
- Nutritional Effects During Pregnancy, Lactation, and Early Life. Standards for nutrient intake and methods for assessing nutritional status are being developed for infants, children, and pregnant and lactating women. The role of diet in optimum growth and development is being studied.
- Assessment of Individual Nutritional Status. Factors, forces, and trends that cause malnutrition can be identified, and criteria can be developed for the design and evaluation of nutrition intervention programs.
- Nutritional Needs of the Elderly. Research is directed toward identifying the role of human nutrition in the aging process and in maintaining health throughout the lifespan.

34. MEAT AND POULTRY INSPECTION

All meat and poultry sold in interstate or foreign commerce must be federally inspected for wholesomeness and truthful labeling.

Meat and poultry sold in intrastate commerce may be inspected under State inspection programs equal to the Federal program. If a State is unable to operate its own inspection program, USDA's Food Safety and Inspection Service (FSIS) must assume responsibility for intrastate inspection as well.

FSIS inspectors examined over 119 million meat animals and nearly 5.4 billion birds in fiscal year 1987. In addition, more than 68 billion pounds of processed poultry products and more than 67 billion pounds of processed meat products were inspected.

Meat and poultry that is unwholesome, adulterated, or mislabeled is kept out of the consumer food supply. During 1987, FSIS inspectors condemned as unwholesome more than 63 million birds and nearly 378,000 meat animals.

USDA compliance officers maintain constant vigilance in marketing channels to check for uninspected meat and poultry, counterfeit inspection stamps, inaccurate labels, and contaminated or spoiled products.

USDA may detain any suspect product, and criminal charges may be brought against anyone in marketing channels who violates the Federal meat and poultry inspection laws.

Each foreign plant that ships meat or poultry to the United States and the inspection system of the country in which it is located must be certified by USDA. Federal veterinarians visit the plants as often as necessary to ensure compliance with USDA requirements, but must visit them at least once a year to check on the adequacy of foreign inspection.

At U.S. ports of entry, USDA inspectors examine shipments, as an additional safeguard, to see that imported products meet U.S. standards for wholesomeness and proper labeling. In fiscal year 1987, FSIS inspectors approved 2.6 billion pounds of products for entry into the United States; more than 12 million pounds were rejected.

Standards and labeling requirements are important phases of the inspection system. In fiscal year 1987, USDA labeling specialists examined for accuracy and completeness over 136,000 label designs submitted by processors for advance approval. These specialists also make sure that ingredient statements on products list the ingredients in order of predominance.

USDA gives special attention to monitoring meat and poultry for possible drug, pesticide, and chemical residues. As part of this effort, FSIS maintains a contamination response system (CRS) to assure rapid communication during discovery and cleanup of environmental contamination problems in the food supply.

USDA conducts a public information campaign to alert consumers to the fact that improper handling of meat and poultry may result in food-borne bacteria poisoning. Should such poisonings occur, a special USDA epidemiological unit works with local, State, and Federal public health agencies to speed identification of the cause.

35. EGG PRODUCTS INSPECTION

The purpose of the Egg Products Inspection Act is to assure that eggs and egg products that reach the consumer are wholesome and unadulterated. Egg products are used by many large manufacturers to make cakes and other prepared food products.

Under the act, the Agricultural Marketing Service (AMS) provides continuous mandatory inspection in all plants processing liquid, dried, or frozen egg products. The act also controls the disposition of restricted shell eggs, those that might contain harmful bacteria that could cause foodborne illness.

In calendar year 1988, AMS inspected some 1.6 billion pounds of liquid, frozen, and dried egg products in 86 processing plants.

USDA and cooperating State agencies registered 2,119 egg handlers and hatcheries and made 9,500 inspection visits to assure that restricted shell eggs were disposed of properly.

Four hundred samples of egg products were analyzed for chlorinated hydrocarbon residues, and no violative products were detected.

Under the act, egg products from a foreign country can be imported into the United States only if the country's inspection system is equivalent to that of the United States. Canada and the Netherlands are the only countries eligible to export egg products to the United States.

V. FARM PRODUCTION AND MARKETING PROGRAMS

36. PRODUCTION ADJUSTMENTS

The Food Security Act of 1985 authorizes programs to protect farmers' incomes through target prices for wheat, feed grains (corn, sorghum, oats, and, if designated, barley), cotton, and rice. The programs, administered by the Agricultural Stabilization and Conservation Service (ASCS), also provide measures aimed at assuring an adequate supply of food and fiber at reasonable prices.

The 1985 act continued the authority for the Secretary of Agriculture to establish an acreage reduction program for any of the crops or a set-aside program, if the Secretary determines that the total supply would be excessive in the absence of such a program.

Acreage reduction programs were implemented in 1988 for the seventh consecutive year. The acreage reduction is achieved by applying a uniform reduction percentage to each participating farm's acreage base for a specific crop. This acreage base is determined from the history of the crops planted or considered planted on the farm.

The acreage reduced from production (the Acreage Conservation Reserve) must be devoted to conservation use measures sufficient to protect the land from weeds, and from wind or water erosion.

The act also authorizes a voluntary paid land diversion for producers of rice, feed grains, cotton, and wheat if the Secretary determines that such adjustment is necessary to reduce production. Acreage removed from production under this program must also be devoted to a conservation use.

For peanuts and most kinds of tobacco, earlier legislation provided for marketing quotas. The Secretary of Agriculture must proclaim these quotas when supply prospects exceed specified levels. If approved by two-thirds or more of the producers of each commodity voting in a referendum, the marketing quotas become mandatory for all producers of that commodity, and price support also becomes mandatory.

Tobacco program amendments enacted April 1986 provide for growers and buyers to share equally the assessments to operate the price support and production adjustment program at no net cost to the taxpayer, other than the administrative expenses common to the operation of all price support programs. The poundage quotas for flue-cured and burley tobaccos equal the purchase intentions of domestic cigarette manufacturers, 3-year average of exports, producer association inventory adjustment, and limited discretion of the Secretary of Agriculture (plus or minus 3 percent).

The peanut program features a two-tier price support system and poundage quotas. Acreage allotments remain suspended for the 1986-90 crops. The poundage quota is the quantity estimated to be devoted to domestic edible, seed, and related use.

Price support will be available on peanuts produced within the poundage quota (quota peanuts) at the higher domestic edible peanut support rate. The quota support rate for 1988 was $615.27 per ton, and the figure is adjusted each year by any increase in production costs.

Anyone can grow and contract additional peanuts for export or domestic crush. Additional peanuts are supported at levels taking into account world market prices and potential losses to the Government. For 1988, this rate was $149.75 per ton.

37. INCOME AND PRICE SUPPORT PROGRAMS

Producers complying with the announced farm programs are eligible for Commodity Credit Corporation (CCC) loans and purchases, target price protection (deficiency payments), and land diversion payments when applicable.

The target price is designed to provide income support for producers when market prices are below the target levels. The payment is based on a rate by which the target price exceeds the larger of the national weighted average market price or the national price-support loan rate for the crop. The farm payment is determined by multiplying the rate times the product of the planted acreage within the permitted and the established yield on a farm.

Price support to farmers is provided through commodity loans or other means for food grains (wheat, rice, and rye); feed grains (corn, sorghum, barley, and oats); oil crops (soybeans and peanuts); fibers (wool, mohair, and cotton); milk; tobacco; honey; sugar beets, and sugarcane.

The loan programs are financed by the CCC and administered by USDA's Agricultural Stabilization and Conservation Service (ASCS).

Price support assistance for wheat, rice, feed grains, cotton, peanuts, and tobacco is usually contingent upon participation by the farmer in applicable annual programs. The assistance to participating farmers is provided at preannounced levels set within statutory guidelines. Methods include loans on crops held in storage by farmers, market purchases in times of excess supply, and supplemental payments to wool and mohair producers.

Loans on eligible commodities are made to producers through ASCS county offices and approved cooperatives. The loans are "nonrecourse"; if market prices rise above the loan level, the producer can pay off the loan with interest, and sell the crop on the market.

If prices fall below the loan level, the producer can turn the commodity over to the CCC in full payment of the loan. Price support on tobacco and peanuts is made through producer associations acting for individual producers. Price support to sugar beet and sugarcane producers is provided through loans to eligible sugar processors.

The Food Security Act of 1985 mandated new market enhancement plans (marketing loans) for cotton and rice to make those commodities more competitive in the world market by allowing a producer to repay price support loans at less than the loan rate when world prices are below the basic loan rate.

The 1985 act also authorized marketing loans for wheat, feed grains, and soybeans, if the Secretary determines they are necessary to maintain those grains' competitiveness in domestic and world markets.

It also authorized a lower loan payment option for any of the 1986 through 1990 crops of honey. Under this provision, which can be implemented at the discretion of the Secretary of Agriculture, producers with price support loans for any crop year that the option is in effect are permitted to repay their loans at the lesser of the loan level or a level which the Secretary determines will minimize Government expenditures and maintain the competitiveness of U.S. honey in domestic and export markets.

Milk prices are supported by the buying of excess market supplies of milk in the form of cheese, butter, and nonfat dry milk from processors.

The total amount of payments a person may receive under one or more of the annual programs for wheat, feed grains, cotton, and rice is limited to $50,000 for deficiency and diversion payments.

Some of the program payments to producers are paid partially with CCC commodity certificates. The majority of commodity certificates are generic which can be exchanged by producers for cash or for commodities under loan or owned by the CCC. The certificates are also negotiable and can be sold to another producer or to a commercial entity.

38. GRAIN RESERVE PROGRAM

The Food Security Act of 1985 reauthorized the Grain Reserve Program for farmer-owned wheat, corn, grain sorghum, oats, and barley. When entry into the grain reserve program is authorized by the Secretary of Agriculture, producers may enter into a contract extending their loan for an additional 3 years and receive annual storage payments.

Interest is charged during the first year of the agreement. The loans cannot be repaid with cash without penalty until the national average market price for the commodity reaches the trigger release level set by the 1985 act. The matured reserve loan may be extended an additional 3 years if authorized by the Secretary.

Producers with maturing reserve loans may also enter the loan collateral into the special producer storage loan program if authorized by the Secretary. Under the special producer storage loan program, producers enter into a 1-year contract and receive storage payments at the same rates currently earned under the reserve program. The loans may be repaid any time during the 1-year period. If authorized, the loan may be extended.

The Farm Facility Loan Program helps qualifying producers obtain needed onfarm storage for their crops. Applications for these loans are accepted by county ASCS offices only during periods announced by the Secretary of Agriculture.

39. EMERGENCY LIVESTOCK FEED

In emergencies caused by natural disasters, USDA provides feed assistance to livestock producers through programs administered by the Agricultural Stabilization and Conservation Service (ASCS).

These feed programs provide for the sale of CCC-owned grain or for cost-share assistance to livestock producers for the cost of purchasing feed, including hay, in approved counties.

Eligible livestock producers must have insufficient feed available to preserve and maintain their eligible livestock.

To provide additional forage for livestock in emergencies, USDA can also allow haying and grazing on acreage diverted to conserving uses under the production adjustment programs.

40. MARKETING ORDERS

A Federal marketing order gives farmers a means of solving a wide range of problems through unified action. It is a flexible tool. It can be tailored to the needs of those using it. It is a legal tool. It has the force of law, with the Government (USDA) assuring an appropriate balance between the interests of agriculture and the general public.

Each partner—producers and Government—has a unique role. Producers initiate orders and participate in administering them when the orders so provide. USDA, through its Agricultural Marketing Service (AMS), furnishes guidance and sees that the orders are properly administered and enforced.

Marketing order authority is broad and varied, but the basic purpose is to provide the orderly marketing of fruits, vegetables, and milk, and to assure a flow of adequate supplies.

A proposed order for eggs was defeated in a referendum conducted in May and June 1987, as was a proposed order for Florida strawberries in an August 1988 referendum.

MILK: Federal milk marketing orders establish minimum prices, based upon supply and demand conditions, at which milk handlers or dealers may buy milk from dairy farmers. The order must be approved by at least two-thirds of the farmers supplying milk to the marketing area. A favorable vote by three-fourths of the producers is required under some circumstances. Public hearings are held when establishing new orders or making order changes.

Operating at the first level of trade, where milk leaves the farm and enters the marketing system, Federal orders lay the foundation for building more stable marketing conditions. They contain a built-in flexibility needed to cope with market changes. To those living in Federal milk marketing areas, this helps assure a steady supply of fresh milk. Most of the Nation's major population centers are within a milk marketing order area.

FRUITS, VEGETABLES, AND SPECIALTY CROPS: Growers of certain fruits, vegetables, and specialty crops (spearmint oil and some nut crops are examples) use marketing agreements and order programs to bring greater stability and orderliness to marketing.

There were 44 such programs in fiscal year 1988 (Oct. 1, 1987 to Sept. 30, 1988) covering about $3 billion (at the farm level) in crops grown in 32 States.

As in the case of milk marketing orders, orders and agreements for fruit and vegetable growers are issued by the Secretary of Agriculture only after a public hearing where producers, marketers, and consumers may be heard, and after approval by vote of the producers.

After an order and agreements have been issued, the growers and handlers administer them through a committee made up of industry members and, in many cases, an additional member who is appointed to represent the public's interest. Their work is financed by industry assessments.

Most of the orders and agreements have quality and size regulations which make available for the fresh produce market the most desirable grades and sizes. Some have quantity regulations which prevent gluts and shortages by keeping the commodity moving in orderly fashion throughout the marketing season. Many orders and agreements also have marketing research and development authority, which permits them to set up projects to find new market outlets to improve marketing, to advertise, and to promote consumption.

41. RESEARCH AND PROMOTION PROGRAMS

Research and promotion programs enable farmers to finance their own coordinated programs of research; producer and consumer education; and promotion to improve, maintain, and develop markets for their commodities and to solve production and marketing problems.

Laws have been passed authorizing research and promotion programs for beef, cotton, dairy products, eggs, floral products, honey, lamb, mohair, pork, potatoes, watermelon, and wool.

In general, once legislation is enacted, a proposed order is drafted by the industry and submitted to the Department of Agriculture. Then, depending upon the legislation, there could be public hearings, development of recommended and final decisions, and a producer referendum.

The promotion and research order for watermelon is in the developmental stage.

A promotion and research order for honey was issued July 21, 1986. It authorizes promotion and research projects to be funded through assessments on domestic honey producers and importers.

Separate promotion and research orders for beef and pork were implemented in 1986 to strengthen each product's position in the marketplace. The beef program is financed by a mandatory assessment of $1 for each head of cattle sold in the United States and an equivalent amount on imported beef and cattle. The pork program requires an assessment of 0.25 percent of the market value of all hogs sold in the United States and an equivalent amount on imported hogs, pork, and pork products.

In separate referenda this year, producers and importers voted to continue both promotion and research programs.

Under the cotton order, a research and promotion program is designed to expand markets for cotton and its products and to improve cotton's competitive position in domestic and international markets. Producers pay $1 per bale plus an additional assessment of 0.6 percent of the value of the cotton to finance advertising and promotion projects and to support production, processing, and marketing research for development and improvement of cotton products.

The order is administered by a cotton board composed of producer representatives selected by the Secretary of Agriculture from nominations made by cotton producer organizations.

A national program for dairy product promotion, research, and nutrition education is financed by a mandatory, nonrefundable 15-cent-per-hundredweight assessment on all milk sold by dairy farmers. Started in May 1984, the program was extended indefinitely following approval in an August 1985 producer referendum. It is by far the largest of the programs in terms of dollars—nearly $210 million annually.

42. MARKETING IMPROVEMENT

The Federal-State Marketing Improvement Program, administered by USDA's Agricultural Marketing Service (AMS), is designed to solve problems at the State and local levels.

The Federal contribution to projects may equal as much as one-half of the project cost. In 1988, marketing improvement work was conducted under 19 projects in 13 States.

The projects covered improved marketability of agricultural products, domestic market development, economic and physical efficiency of marketing, improved marketing information, developing alternative crops, objective measures for quality grading, and studies of new marketing concepts.

The Wholesale Market Development Program conducts research to find new ways of improving the efficiency of handling and storing food products moving between the farmer and retail outlets. In particular, the program emphasizes the development and design of modern facilities that will contribute toward this goal of efficiency.

Design and feasibility studies are conducted to develop and/or modernize wholesale food distribution centers to serve major urban areas of the United States. Also, significant effort is directed toward the development and design of modern farmers' markets to serve as additional outlets for growers and a source of good for buyers, and local communities.

Additional research is conducted under the program to find ways of improving specific food processing and warehousing activities as well as developing information, systems, and strategies useful to growers and handlers in increasing marketing efficiency. The Wholesale Market Development Program is located in AMS's Commodities Scientific Support Division.

43. AGRICULTURAL TRANSPORTATION

An efficient national transportation system is vital to market farm and food products effectively. Although the transportation system serving U.S. agriculture is highly developed, there are many complex and critical transportation issues that must be resolved for the system to work more effectively.

USDA's Office of Transportation (OT) consolidated the transportation activities of several USDA agencies in December 1978 so that personnel, materials, and funds could be directed more efficiently to deal with agricultural transportation concerns.

Some of the issues the office is involved with are waterway user fees, the condition of rural roads and bridges, the impact on agriculture of rail and truck deregulation, and export promotion.

OT also conducts technological research, usually in cooperation with industry, on such projects as improved handling and packaging technologies for perishables, cryogenic refrigeration (use of carbon dioxide snow) for transporting frozen foods, new handling procedures for the air shipment of bees, and handling and regulatory requirements for shipment of livestock.

OT develops agricultural and rural development transportation policies and programs. It represents the interests of agriculture and rural communities to regulatory agencies so that efficient and economical transportation services and facilities are available domestically and internationally. It also represents USDA in transportation discussions with other government agencies to plan for rural highways and other transportation facilities.

OT provides information that considers the needs of rural communities and agriculture to Federal and State decisionmakers involved in regulatory, policy, and legislative matters. It supplies technical assistance and information to farmers, shippers, carriers, and others about specific transportation needs of agriculture and rural communities. OT identifies barriers and estimates adverse impacts on transport systems in agricultural and rural areas.

In international transportation matters, OT is concerned with maritime policies affecting the competitiveness of U.S. agricultural products worldwide and constraints in foreign ports that limit the import of U.S. products.

OT has the leadership in coordinating U.S. agricultural exports to Mexico as part of a working group established in a bilateral agreement between the two countries. OT also administers the Agreement on the International Carriage of Foodstuffs, an Economic Commission for Europe treaty.

OT also coordinates demonstration projects to improve national and international transport systems for agricultural products.

44. MARKET REGULATORY LAWS

Through its Agricultural Marketing Service, USDA administers and enforces regulatory laws that help make marketing more orderly and efficient.

The Perishable Agricultural Commodities Act establishes a code of trading ethics and encourages fair trading in the marketing of fresh and frozen fruits and vegetables. It prohibits unfair and fraudulent business practices and provides a forum to resolve contract disputes. Injured parties can collect damages from any buyer or seller who fails to live up to contract obligations.

The law also protects sellers of produce by imposing a trust on a buyer's inventory and receivables, which gives the seller a security interest in the product until payment is received.

The Federal Seed Act complements the seed laws of the 50 States by prohibiting the interstate shipment of seed contaminated with excessive noxious weeds and requiring that all agricultural and vegetable seeds shipped interstate be truthfully labeled. It prohibits false advertising and prohibits seed imports of seed contaminated with noxious weeds.

The Plant Variety Protection Act extends patent-type protection to developers of plants which reproduce through seeds. Developers of new varieties of such plants as soybeans, wheat, corn, and marigolds apply to USDA for certificates of protection. USDA examiners determine whether the variety actually is novel and entitled to protection. The holders of certificates can turn to the courts to protect their "inventions" from exploitation by others.

The Agricultural Fair Practices Act enables farmers to file complaints with USDA if processors refuse to deal with them because they are members of a producer's bargaining or marketing association. This statute makes it unlawful for handlers to coerce, intimidate, or discriminate against producers because they belong to such an association. USDA helps to institute court proceedings when farmers' rights are found to be so violated.

Safe storage plays an important part in the orderly marketing of farm commodities because immediate sale is not always possible or advantageous.

Under the U.S. Warehouse Act, USDA operates a voluntary warehouse licensing system and a program of periodic examinations of licensed warehouses and their contents to help prevent deterioration and loss of stored products.

USDA also examines those warehouses that store goods owned by the Commodity Credit Corporation and on which CCC loans have been made.

45. MARKET NEWS

The Federal-State market news service, carried out by USDA's Agricultural Marketing Service (AMS) in cooperation with 44 State agencies, the District of Columbia, and 3 territories, reports up-to-the-minute information on prices, supply, and demand for most agricultural commodities.

This information aids producers, wholesalers, and others in the marketing chain in deciding where and when to buy or sell. The industry voluntarily provides the information on which market news reports are based.

Almost anywhere and any time trading in farm products goes on, Federal-State market news reporters are at work providing information about market conditions to the agricultural community.

Market news reporters gather data during visits to trading points and by telephone on qualities and quantities of the products sold, the prices paid, the demand, the movement, and the trends. From this information they develop timely, accurate, unbiased market reports for practically all agricultural commodities. They continually gather this information throughout every trading day. And they get it out promptly to the waiting public.

The reports cover buying and selling of these commodity groupings: cotton and cottonseed; fruits, vegetables, including, as of this year, imported fruits and vegetables; floral products, and specialty crops; livestock, meat, poultry, eggs, grain, hay, feeds, and wool; dairy products; and tobacco.

AMS utilizes satellite communication, earth stations, and microcomputers to compile 750 to 900 market news messages and reports each day. This totals approximately 50 million characters of information transmitted by satellite and received at 130 electronic terminals across the country daily.

News from California can be available in New York and points in between only minutes after it is released.

Automatic telephone answering devices are also used to disseminate market news. In 39 States a farmer or trader can dial a local number and receive a recorded message—updated several times a day—with the latest market news reports for a particular commodity in a specific area.

Market news reports also find their way into newspapers and magazines, radio and television, bulletin boards, and printed reports that are available on subscription.

Market news reporters gather and document information through personal observation of the transaction, talks to buyers and sellers, and checks on sales records. They must make sure that an accurate picture of the market is given because many people rely on their reports.

Like their fellow employees in standardization and grading work, market news reporters have to be experts on the commodities covered. Even if the product is not officially graded, the reporter must often report prices paid for the various qualities of products in terms of the nationally understood language, U.S. grades.

Only in this way can prices, supply, and demand be realistically compared from day to day and from market to market throughout the country.

Farmers and others who buy and sell farm products need to make these comparisons. They need market news in making decisions on how much and what kind of product to grow, on where and when to market, on whether or not to accept a price bid.

This information helps to keep the marketing channels filled but not overflowing, preventing unnecessary and wasteful gluts and shortages, and helping provide consumers with a reliable and reasonably priced supply of foods to meet their daily needs.

Market news reports may help an Iowa hog grower, for instance, decide whether to ship the hogs to a terminal market, sell them at a nearby auction or direct buying station, or hold back for a few days if a heavy run is reported. Market reports in the local newspaper or on radio or television were likely provided by the Federal-State market news reporter.

Similar stories could be told about the need for market news for every other important farm commodity—and how this need is being met by the market news services.

Market news services are operated cooperatively with State departments of agriculture, or in the case of cotton, a price quotations committee. AMS provides the centralized direction and coordination necessary to achieve nationwide uniformity and make the market news reports useful throughout the country.

46. FEDERAL GRADING PROGRAMS

USDA grade standards and grading services for food and farm products provide buyers and sellers with an impartial appraisal of the quality of what is being sold. The buyer has the right to expect a particular quality from USDA Choice beef, USDA Grade A eggs, USDA AA butter, U.S. No. 2 yellow corn, or any other USDA graded product. Likewise, the seller has the right to expect a price for the product commensurate with its quality.

Two USDA agencies—Agricultural Marketing Service (AMS) and Federal Grain Inspection Service (FGIS)—provide voluntary and in some cases, by FGIS, mandatory grading services for most food and farm products.

Grading is provided by a well-trained staff of Federal graders in cooperation with State departments of agriculture, and the users—usually exporters, packers, or processors who request the service—are charged a fee for it.

During fiscal year 1988, USDA graded 56.2 percent of the federally inspected beef production in the United States, 50 percent of the total fresh fruits and vegetables, 40 percent of the shell eggs going to consumers, 62.5 percent of the butter, 55 percent of the frozen fruits and vegetables, 45 percent of the canned fruits and vegetables, 90 percent of the turkeys, and 67 percent of the chickens and other poultry.

USDA also classed more than 97 percent of the cotton and inspected 95 percent of the tobacco produced in the United States.

USDA grade standards are continually appraised by experts so that they remain realistic. Each year about 7 percent of the standards for about 400 food and farm products are revised to keep them consistent with current marketing practices. In addition, new standards are developed as the need arises.

The number of grades for a particular product depends on its variability. It takes eight grades to cover the quality levels in beef, but only three for turkey. There are over 300 standards covering a wide range of fresh and packaged fruit and vegetable commodities. These standards help the buyer and seller understand quality levels. Ultimately, these standards assure the consumer of a uniform and consistent quality.

Grading is used more often at the wholesale level than at the consumer level. Grade labeling of food products is not required by Federal law.

During calendar year 1987, U.S. farmers produced 329.5 million metric tons of grains and oilseeds. In fiscal year 1987, FGIS's national grain inspection system performed about 3.5

million grain inspections representing 288.5 million metric tons of grain. Two-thirds of the grain inspected (190.4 million metric tons) represented intrastate and interstate shipments.

The majority of the domestic shipments were performed at interior locations by State and private grain inspection agencies which are designated authority by FGIS to inspect grains under the U.S. Grain Standards Act. About 98.1 million metric tons of grains and oilseeds were inspected at export locations by FGIS and eight Delegated State Agencies.

Also, the national inspection system graded about 4.1 million metric tons of rice in fiscal year 1987.

47. FEDERAL GRAIN INSPECTION

The Federal Grain Inspection Service (FGIS) was established in 1976 as a separate agency in USDA. Its primary task is to carry out provisions of the U.S. Grain Standards Act. The agency is mandated by Congress to establish a nationwide system to assure integrity in the inspection, weighing, and handling of U.S. grain, both at interior and export locations.

The orderly marketing of grain requires uniform descriptions that are understood and accepted by buyers and sellers. To meet this need, official U.S. standards have been developed for 11 grains: corn, wheat, rye, oats, barley, flaxseed, sorghum, soybeans, sunflower seeds, triticale, and mixed grain. Standards are reviewed and revised when necessary to meet current marketing needs and practices.

Most grain for export must be officially weighed. It must also be inspected for quality if it is marketed under a U.S. grade unless a waiver is obtained. The inspection and weighing of export grain must be performed by FGIS personnel, or licensed employees of one of eight States that have been delegated this authority.

For grain that is handled at inland locations or sold in the domestic market, private firms and State agencies are designated to provide official inspection service under FGIS supervision. Such inspection is provided on a request basis. Official weighing is authorized on a request basis for grain that is being sold in the domestic market.

Fees for inspection and weighing are paid by the users of the services. Buyers or sellers in either export or inland markets who are not satisfied with the grades they receive can request a reinspection or an appeal inspection.

In addition to the inspection and weighing of grain, FGIS is also responsible, under the Agricultural Marketing Act of 1946, for inspection and weighing of rice, dry beans, peas, lentils, processed grain products, hops, and other assigned agricultural commodities. These services are available on a request basis. Fees for the inspection and weighing services are paid by the users of the services.

48. MEAT, POULTRY, AND LIVESTOCK MARKETING REGULATIONS

The Packers and Stockyards (P&S) Act, administered by USDA's Packers and Stockyards Administration (P&SA), regulates marketing practices in the livestock, poultry, and meat industries. Specifically included are livestock markets (terminal and auction markets), livestock market agencies, livestock dealers, meat packers and live poultry dealers.

The law prohibits unfair, deceptive, discriminatory, and monopolistic trade practices in regulated industries. It also provides financial protection for livestock producers.

The P&S Act encourages fair and open competition in the marketing of livestock, poultry, and meat to assure that true market value is received. Livestock markets, buying stations, dealers, packers, and poultry processors subject to the act must maintain accurate scales and weigh livestock, poultry, and meats accurately.

49. FARMER COOPERATIVES

Four out of every five commercial farmers use cooperatives for one reason or another to market their products, provide their supplies, and procure needed services.

Farmers have large investments in all types of cooperatives. The Balance Sheet of the Farming Sector shows farmers' equity in these agriculturally related businesses was $24.5 billion at the beginning of 1988, a slight increase from $24.4 billion at the beginning of the preceding year.

The average cooperative investment per farm is $11,250. Agricultural Cooperative Service (ACS) surveys farmer cooperatives each year to measure business activity. Statistics for 1987 show that 5,109 cooperatives transacted a business volume of $59.2 billion (excluding intercooperative business), up 1.3 percent from $58.4 billion in 1986. Net income was $1,486 million, up 116 percent from $688 million in 1986.

Memberships totaled 4.4 million, indicating many farmers belong to more than one cooperative. California leads all States in cooperative business volume with $6.4 billion. Iowa is second with nearly $4.5 billion, and Minnesota third with $4.4 billion.

Minnesota leads all States in the number of cooperatives and memberships, with 519 cooperatives and 370,660 memberships. North Dakota is second in cooperatives with 371 and Texas is third with 346. Wisconsin is second in number of memberships with 293,384 and Iowa is third with 257,715.

Farmers market 28 percent of their raw products and, to varying degrees, process and package products through cooperatives. Dairy products lead in volume of cooperative marketing business, with $16.1 billion. Grain and soybean products are second with $10.7 billion, fruits and vegetables third with $5.6 billion, and livestock products fourth, with $3.2 billion. Other products totaling $1 billion or more were: sugar, $1.7 billion; cotton, $1.6 billion; and poultry, $1.1 billion.

Total marketing volume in 1987 was 43.3 billion, up 4.2 percent from 1986. ACS estimates that about 26 percent of the major farm supplies bought by farmers are purchased from cooperatives. ACS figures for 1987 show cooperatives handled supplies totaling $14 billion, down 7.3 percent.

Petroleum products are the leading farm supply item, accounting for purchases of $4.2 billion. Fertilizer and feed each account for $2.7 billion. Farmers obtained nearly $1.9 billion worth of farm-related services through cooperatives.

ACS provides research, management analysis, and technical and educational assistance to cooperatives to strengthen the economic position of farmers and other rural residents. It works directly with cooperative leaders and Federal and State agencies to improve organization, leadership, and operation of cooperatives and to give guidance to further development.

ACS (1) helps farmers and other rural residents develop cooperatives to obtain supplies and services at lower cost, and get better prices for products they sell; (2) helps cooperatives improve services and operating efficiency; (3) informs members, directors, employees, and the public on how cooperatives work and benefit their members and their communities; and (4) encourages international cooperative programs.

ACS also publishes research and education materials and issues the publication Farmer Cooperatives.

VI. CONSERVATION: SOIL, WATER, TREES

50. SOIL AND WATER CONSERVATION

Soil Erosion Rate

Estimated average annual erosion from the Nation's farmland and other non-Federal lands is more than 6.5 billion tons of soil, according to the Soil Conservation Service (SCS). Of this total, about 1.1 billion tons erode from streambanks, gullies, construction sites, roads, and roadsides.

In many areas, the rate of erosion seriously threatens long-term agricultural productivity. Erosion rates exceed tolerable levels on 299 million acres of cropland, pastureland, forest land, rangeland, and other rural lands. Scientists consider erosion tolerable when eroded topsoil can be replenished through natural processes.

Of the more than 6.5 billion tons of soil losses from wind and water erosion each year, more than 3.4 billion tons erode from rural land.

The greatest soil losses are on cropland, which is sustaining an estimated annual soil loss of 3 million tons. Of the 421 million acres of cropland, 185 million acres (44 percent) is eroding at greater than tolerable rates. About 60 million acres (14 percent) of the Nation's cropland is eroding at rates exceeding three times the tolerable level.

Sediment, the greatest single water pollutant by volume, is an end product of soil erosion.

Fighting Erosion with Conservation Systems

Fortunately for the future of America's farmlands, many practical systems are available for controlling soil erosion. More than 2 million landusers have signed up with local conservation districts to apply conservation measures on their farms and ranches.

Technical help comes from the SCS, and cost-sharing from SCS and the Agricultural Stabilization and Conservation Service (ASCS).

Among the most successful techniques for erosion control are various forms of conservation tillage, in which residue from a previous crop is left in the field. The ultimate conservation tillage system is no-till. This system leaves virtually all of the previous crop residue mulch on the soil surface on a year-round basis.

Where feasible, no-till farming reduces erosion to negligible rates.

The National Association of Conservation Districts' (NACD) Conservation Tillage Center in Fort Wayne, Indiana, encourages greater use of conservation tillage on American farms. USDA, the agribusiness sector, and other organizations help the center with its work.

During fiscal year 1988, SCS provided direct technical services to 2,136,396 land users and units of government. As a result of these services, 89,431 land users applied one or more conservation practices on the land which treated a total of 61.8 million acres. SCS provided conservation plans on more than 36.7 million acres of land.

SCS gives technical assistance to farmers, ranchers, other individuals and groups, and local and State governments to reduce erosion and sedimentation, conserve water and improve water quality, reduce energy requirements, and plan better land and water uses. SCS provides help largely through some 3,000 local conservation districts that are organized under State law by local people.

In addition to direct help to landowners and operators, SCS has USDA leadership for the National Cooperative Soil Survey. The Service also helps reclaim abandoned mines and provides conservation assistance to current mining operations.

SCS provides technical and financial assistance to sponsoring groups in planning and installing small watershed protection projects under Public Law 566 and related acts. The agency also participates in various river basin surveys and investigations, provides flood hazard information for communities, and helps in postflood restoration work on streams and rivers.

SCS has leadership with USDA for the Resource Conservation and Development Program; for the Great Plains Conservation Program, which provides long-term financing and conservation assistance in parts of 10 States; and for conducting snow surveys in cooperation with other Federal, State, and private agencies involved in water supply forecasting in the West.

SCS assists schools in planning and building outdoor conservation classrooms and helps environmental and wildlife groups with natural resource projects. It also finds new strains or adapts grasses, legumes, shrubs, and trees for a wide range of conservation uses, including increased protection and production of pasture and range; windbreaks; wildlife food and cover; protection of streambanks and shorelines; highway rights-of-way; and reclamation of surface-mined land.

51. CONSERVATION AND THE 1985 FOOD SECURITY ACT

The Food Security Act of 1985 included some landmark conservation provisions to encourage the reduction of soil erosion on agricultural land and protect wetlands. For the first time, a farmer's conservation activities were linked to his or her eligibility to receive farm program benefits. Three key provisions of the act deal with highly erodible land, wetland conservation, and the Conservation Reserve Program (CRP).

Final rules to implement the highly erodible land and wetland provisions were issued by USDA on September 17, 1987. Under these rules, the Soil Conservation Service (SCS) is responsible for identifying highly erodible lands, wetlands, and converted wetlands, and for helping land users plan and apply conservation systems to maintain their eligibility to participate in certain USDA programs under agreements with USDA's Agricultural Stabilization and Conservation Service (ASCS).

The criteria used to identify erodible lands are based on an erodibility index of eight or more which considers the inherent characteristics of the soil to resist the forces of water or wind erosion, not the practices of management applied by man which may vary from year to year.

Under these criteria, 118 million acres of cropland and 227 million acres of noncropland that have a potential to be converted to cropland in the future are designated as highly erodible.

On existing cropland, a producer must be actively applying an approved conservation plan by December 31, 1989, and have the plan fully implemented by December 31, 1994, in order to maintain eligibility for USDA program benefits under ASCS agreements.

Conservation plans will be required on about 1 million farms by January 1, 1990. As of December 31, 1988, 65 percent of the conservation plans were completed and approved.

Noncropland brought into production of an agricultural commodity after December 23, 1985, must have an approved conservation system in place prior to crop production if a producer is to maintain his or her eligibility for certain USDA program benefits.

The wetlands conservation provision is aimed at discouraging the conversion of wetlands for agricultural purposes. As defined by the act, wetlands consist of soils that are covered with standing water or are saturated part of the year and that support mostly water-loving plants. This provision could affect an estimated 5 million acres.

Farmers will lose their eligibility to participate in certain USDA programs if they convert wetlands for the production of an agricultural commodity after December 23, 1985.

Farmers participating in the CRP sign a 10-year contract with ASCS agreeing to take the eligible land out of production and establish a protective cover of perennial grass, wildlife plants, windbreaks, or trees.

In return, ASCS provides annual rental payments, in cash or commodities, for the land removed from cultivation and provides cost-share assistance to cover 50 percent of the cost of establishing a permanent cover on the land. The farmer must implement a conservation plan, approved by the local conservation district, for the land. Planning and technical assistance is provided by USDA and State forestry agencies, and local soil and water conservation districts.

The CRP encourages farmers to stop growing crops on highly erodible lands and to plant grass and trees. It has the potential to remove 40-45 million acres of highly erodible land from cultivation.

CRP planning and technical assistance is provided by the SCS, conservation districts, Forest Service, State forestry agencies, and others. During the contract period, farmers may not reap commercial benefits from the land under the CRP through haying, grazing, or seed or tree production.

SCS has provided technical assistance to nearly 270,000 farmers who have entered into contracts with the Secretary of Agriculture. These contracts will convert 28.1 million acres of highly erodible cropland to grass, trees, or wildlife cover. This means that more than 62 percent of the planned 45- million-acre program goal has been achieved.

Establishment of cover on land now included in CRP contracts will reduce the estimated annual rate of erosion by 20 tons per acre per year from these lands.

52. CONSERVATION, WATER QUALITY PROGRAMS

The Agricultural Conservation Program (ACP), administered by the Agricultural Stabilization and Conservation Service (ASCS), provides for cost-share assistance to farmers and ranchers in carrying out measures to prevent soil loss from wind and water erosion, solve water conservation and water quality problems, enhance forest resources, and treat other natural resource problems.

The program stresses solving local environmental problems.

Local authority under the program is delegated to the county ASC committee, which consults with the county conservation review groups to develop practices to solve soil and water conservation problems, prevent pollution, and conserve energy. Included are Federal and State agencies and other organizations interested in soil and water conservation and other environmental problems.

The Soil Conservation Service (SCS) and the Forest Service (FS) provide technical program guidance to ASCS committee members and technical assistance to farmers in carrying out conservation practices. If a conservation practice is approved, the Government will bear part of the cost of conservation work, while the farmer bears the balance. Special program provisions provide for an increased cost-share rate for low-income farmers.

The Colorado River Salinity Control Program provides financial and technical assistance to identify salt source areas in the Colorado River Basin; to install conservation practices to reduce salinity levels in the Colorado River; to carry out research, education, and demonstration activities; and to carry out monitoring and evaluation activities. Several USDA agencies cooperate in this effort.

The Emergency Conservation Program (ECP), managed through ASCS provides emergency funds for sharing with farmers and ranchers the cost of emergency conservation measures needed to rehabilitate farmland damaged by floods, hurricanes, tornadoes, or other natural disasters, and for carrying out emergency water conservation measures during periods of severe drought.

Subject to availability of funds, USDA implements the ECP for eligible farmers and ranchers when the damage is so costly to repair that Federal assistance is needed to return the land to productive agricultural use.

Two other Federal programs that involve water under farm or ranch management have quite different objectives, although both are intended to improve water quality.

The Water Bank Program, operated by ASCS is available to farmers or ranchers having specified types of wetlands along major migratory waterfowl flyways.

The program is designed to preserve and improve migratory waterfowl and other wildlife habitat; preserve and improve wetlands; conserve surface waters; reduce runoff, soil erosion, and stream sedimentation; contribute to flood control, better water quality, and improved subsurface moisture; and accomplish related conservation and environmental objectives.

The Rural Clean Water Program (RCWP), also administered by ASCS, is an experimental program designed as a cooperative endeavor to develop and test policies, procedures, and methods for controlling agricultural nonpoint sources of pollution.

This program treats specific types of water quality problems such as runoff containing nutrients and/or pesticides, animal waste, leachates, irrigation return flows, and sediment.

This voluntary program provides long-term financial and technical assistance to owners and operators of privately held agricultural land in selected project areas who install conservation measures to control water pollution.

53. GREAT PLAINS CONSERVATION PROGRAM

The region known as the Great Plains contains important grazing lands and cropland, including vast acreages of wheat. Located in 10 States, it is an area of light and fragile soils, relatively low rainfall, and periodic drought and dust storms.

In 1956, Congress established the Great Plains Conservation Program (GPCP) to help stabilize the agriculture of this vast area. The program helps land users change their farm and ranch operations to mitigate natural hazards of the Great Plains, such as those related to climate, soil, topography, floods, and salinity. The changes include measures for erosion control, water conservation, and land use adjustment.

Under the program, a participating landowner or land operator:

- Works out a conservation plan and schedule;
- Contracts with USDA's Soil Conservation Service (SCS) to apply all the conservation work in from 3 to 10 years;
- Gets technical help from the SCS as needed; and,
- Receives from the Federal Government a portion of the cost of conservation treatment as the landowner or operator completes it.

In 1988, 930 farmers and ranchers signed long-term contracts to apply conservation measures on more than 2.1 million acres.

The program is available to farmers and ranchers in 518 counties in the 10 States: Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming.

The GPCP is coordinated with other Federal, State, and local governmental agencies. It is intended to be an addition to, and not a substitute for, other programs available in the Great Plains area.

In 1980, Congress extended the GPCP to September 30, 1991.

54. FOREST MANAGEMENT

Studies show that future demand for timber is likely to rise more rapidly than supply, resulting in increasing costs for housing and other wood products. Forest management programs of the U.S. Department of Agriculture are designed to help meet the rising demand for wood products and other forest goods and services.

USDA's Forest Service (FS) administers 191 million acres of National Forests and National Grasslands. It cooperates with State foresters in providing advice on forest management and use to non-Federal owners of forested lands and wood processors, and conducts research to support these activities.

The Agricultural Stabilization and Conservation Service (ASCS), in cooperation with the Forest Service and State forestry agencies, provides cost-sharing with private landowners for woodland management practices.

The Soil Conservation Service (SCS) assists private landowners in developing conservation plans for all land uses, including forest lands. Through such programs as the Agricultural Conservation Program, the Conservation Reserve Program, and the Small Watershed Program, USDA further recognizes the importance of America's woodlands in assuring conservation and enhancement of the Nation's natural resources and a quality environment.

America's forest lands occupy about 740 million acres, one-third of the Nation's 2.3 billion acres of land. The National Forests occupy 191 million acres, including 85 million acres, or 18 percent of the country's 483 million acres of timberland, and contribute 13 percent of the Nation's total annual timber harvest.

Industry owns 15 percent of those 483 million acres, contributing 32 percent of the national timber harvest. Eleven percent is in other public lands which provide about 7 percent of the national timber harvest. But most of the timberland in the Nation, 57 percent, is controlled by about 7.7 million nonindustrial private owners. These private lands contribute 48 percent of the national timber harvest.

In 1986, about 51 percent of the Nation's timber harvest came from the South, 28 percent from the Pacific Coast, and 21 percent from the North and Rocky Mountain areas. The South is expected to be the major timber producer in the future.

New national measures of forest productivity, for softwood and hardwood timber, were developed recently by the USDA Forest Service. The new forest productivity statistics reveal, very concisely, some of the more important trends in forest productivity which forest resource specialists have been studying for many years.

The productivity of the Nation's softwood timber resource, as measured according to recently developed indexes, continues to improve. The indexes show that growth per unit of inventory has continued to increase, as have softwood removals per unit of inventory, as shown in table 17. This nationwide trend reflects increases in harvests relative to inventory on all ownership classes—forest industry, other private, national forests, and other public lands, appendix I, table 32. Growth increases also occur on all these ownerships, except the important other private class—primarily in the South. This has been recognized as an issue that needs to be addressed to maintain long-term timber supplies and industrial production and employment.

The productivity indexes for the hardwood timber resource show a decline since 1970, despite continuing growth in the total inventory of hardwood timber. This reflects a continuing increase in hardwood inventory substantially greater than the slow increase in annual removals. Inventory increases are the result of growth rates that continue to be nearly double the rate of harvest. This large hardwood inventory offers an exceptional opportunity to expand domestic and export markets.

The large gains in forest productivity for softwood timber have occurred in conjunction with increased use of softwood timber and consquently better management of the softwood timber inventory, althought the recent decline of softwood growth in the South suggests a continued need for improved forest management. The decline in productivity for hardwood timber, except in terms of growth per acre, suggests that hardwood timber inventory needs better management that could result from new markets and increased use of hardwood timber.

The two accompanying charts show U.S. productivity trends for both hardwood and softwood.

The Forest Service is responsible for controlling forest insects and diseases directly on the National Forests, in cooperation with other Federal departments on other Federal lands, and in cooperation with State foresters or equivalent State officials on State and private lands in the United States.

Through its forest pest management program, the Forest Service surveyed 640 million acres of forested lands of all ownerships in 1987, to detect and evaluate pest problems in their early stages.

Through cooperative programs with the States, the Forest Service provided 158,353 'assists' to woodland owners in 1987. Assistance in tree planting, seeding, timber stand improvement,

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Table 17.—Timberland area, timber growth, removals, and inventory, growth per acre, and forest productivity indexes for softwoods and hardwoods in the United States, for all ownerships and regions, 1952-87 (1977=100)

Timber		Softwoods						Hardwoods					
Year	Land area	Net annual growth	Annual removals	Total inventory	Annual growth per acre	Productivity indexes		Net annual growth	Annual removals	Total inventory	Annual growth per acre	Productivity indexes	
						growth/ inventory	removals/ inventory					growth/ inventory	removals/ inventory
Acres	million	Billion cubic feet			Cu. ft.			Billion cubic feet			Cu. ft.		
	United States, all owners and regions												
1952	508	7.7	7.8	430	15.2	67	83	6.2	4.1	180	12.2	96	140
1962	518	9.6	7.6	448	18.5	80	78	7.1	4.3	210	13.7	94	128
1970	505	11.3	9.4	458	22.4	93	94	8.5	4.7	234	16.8	101	125
1977	491	12.4	10.0	465	25.2	100	100	9.3	4.2	260	19.0	100	100
1987	481	12.7	11.9	449	26.5	106	122	9.6	5.2	303	20.0	88	106

Source: USDA Forest Service

and other woodland activities affected some 1,098,946 acres of timberland.

State nurseries distributed 733 million seedlings for use in forest and windbarrier plantings. USDA funds helped survey 594 million acres of forest for insect and disease infestation, and over 944 million acres were protected from fire with shared USDA funds.

Private forest landowners also improved the recreational potential on 214,197 acres, and wildlife habitat on 713,385 acres. Forest management plans were prepared for 73,769 areas. In addition, 1,360 acres of critically eroding area were stabilized by tree planting; 12 acres of surface-mined areas were stabilized; and 18 miles of firebreaks and fuelbreaks were constructed on critical watersheds.

The Forestry Incentives Program (FIP) is jointly administered by the ASCS and the Forest Service (FS) in cooperation with State forestry agencies.

FIP authorizes the Federal Government to share with private landowners the cost of planting trees and improving timber stands. The Federal share of these costs can be up to 65 percent.

Participation in the program is limited to landowners with a maximum of 1,000 acres of forest land, although exceptions can be granted at the discretion of the Secretary of Agriculture for ownerships of up to 5,000 acres.

FIP is available in counties designated on the basis of an FS survey of total eligible nonindustrial private timber acreage that is potentially suitable for production of timber products. In 1986, 201,154 acres were treated under FIP.

From the beginning of the program in 1975 through fiscal year 1986, 92,000 private landowners entered into cost-share agreements with ASCS under FIP. These agreements called for 1.8 million acres of tree planting and for 1.0 million acres of timber stand improvement. All practices were certified by State foresters.

The Forest Service assists State foresters in organizing, training, and equipping local firefighting forces to protect lives, crops, livestock, farmsteads, and other resources in rural areas and rural communities. State foresters are also encouraged to make use of Federal excess personal property to protect non-Federal lands.

In 1987, the Cooperative Fire Protection program suppressed 124,027 fires that burned 1,714,950 acres of protected wildlands.

The annual harvests from the National Forest System are carefully calculated to assure continually productive forest lands.

In fiscal year 1987, about 12.7 billion board feet of timber were harvested under strict conservation regulations contained in timber sale contracts.

Returns from these timber sales were $1.0 billion. As provided by law, 25 percent of all National Forest income is returned to the States containing the forests from which the income was derived; in fiscal year 1987, this amounted to more than $286 million.

Under the Multiple-Use Sustained Yield Act of 1960, these forests must be managed so as to yield a wide range of other social goods and services, including recreation, watershed benefits, livestock grazing, and wildlife habitat.

On National Forest lands, the Forest Service in 1987 planted and seeded 218,772 acres, and improved 223,182 acres of young timber by thinning and release from vegetative competition.

The National Forests and Grasslands are home to more than 4 million big game animals and 139 species of threatened or endangered wildlife. In fiscal 1987, 1.3 million head of cattle and 1.1 million sheep and goats grazed on National Forests and Grasslands under special permits granted to ranch operators.

In addition to sale of timber, income in fiscal year 1987 was $8.1 million from grazing fees, $46.7 million from mineral receipts, and $30.5 million from recreation and user fees.

The National Forests contain 32.5 million acres of wilderness, about 36 percent of the total National Wilderness Preservation System.

At sites operated by eight forest experiment stations and the Forest Products Laboratory, research projects covering forest management, protection, and utilization are underway.

Subjects being investigated include forest genetics and cultural practices to increase yield, control of insects and diseases, suppression of wildfires and beneficial use of fire in forest management, wildlife and fish habitat improvement, recreation, snowpack control and other watershed considerations, environmentally sound harvesting techniques, timber processing techniques to increase yield, use of low-quality or residual wood, protection of wood products from natural degradation, improvements to housing through energy conservation or lumber-saving designs, and urban forestry.

Research findings are made available to the public through publications and the efforts of the Forest Service's State and Private Forestry arm to put innovations into practice.

VII. AGRICULTURAL PLANNING, PRODUCTIVITY, AND PROTECTION SERVICES

55. NATIONAL AGRICULTURAL STATISTICS

An orderly production and marketing system depends on an accurate and current accounting of potential output, available stocks, and the other factors that influence agriculture.

The National Agricultural Statistics Service (NASS), through its Washington, DC, headquarters and 44 field offices serving all States, annually publishes hundreds of reports detailing production and prospects for crops, livestock dairy, and poultry. Other releases outline stocks, prices, labor, weather, and similar items concerning farmers and ranchers and those associated with agriculture.

Geared toward producers, this information can help them plan their planting, feeding, breeding, and marketing programs. The data also are used by agricultural services and businesses, trade groups, and financial organizations to determine needed inputs, resources, transportation, and storage related crop and livestock products.

Information for these continuing series of estimates is gathered from those most closely involved, the producers. Contact is made by mail survey and telephone and personal interview. For such major crops as corn, cotton, wheat, and soybeans, special on-the-spot counts and measurements of plant development are made in a cross-section of fields throughout the Nation.

All the raw indications from these varied sources are summarized by the NASS office serving that State and sent to the agency's Agricultural Statistics Board in Washington, DC, which sets and issues the official estimates for the State and Nation.

All reports are released at scheduled times, and the information is readily available to the public, in printed form through the Agricultural Statistics Board and the Government Printing Office. The information is available electronically through the Department's Electronic Dissemination of Information (EDI) System.

56. AGRICULTURAL ECONOMICS

USDA's Economic Research Service (ERS) does research and analysis covering various topics related to agriculture and rural America. Production and marketing of major commodities is one area of study. Analysts make projections for supply, demand, and use of specific crops, dairy products, and livestock. They predict farm income and food prices.

Another major area of research is foreign agriculture and trade. Economists assess foreign developments and agricultural policies to determine their impact on U.S. foreign agricultural trade.

Use, conservation, and development of natural resources as they affect economic growth are covered, along with the impacts of technology.

ERS economists examine rural population, employment, and housing trends, and rural people's economic adjustment problems.

Performance of the agricultural industry, including the production, processing, and marketing sectors, is another important area that is routinely assessed by ERS.

57. AGRICULTURAL INFORMATION

Information is a vital factor in improving agricultural products and productivity. The Nation's consumers, farmers, and agricultural administrators, researchers, and educators need facts, figures, and findings to make the best decisions. The effective information service gathers, processes, and delivers current and complete information when and as needed.

As its basic mission, the National Agricultural Library (NAL) serves the USDA and the Nation as information provider for agriculture. Responding to priorities set by the Department and by the Congress, NAL provides general information service and at the same time operates 13 information centers focusing on special subject areas. The centers assure provision of information to their particular clientele, using the resources and current technology applications being developed by the library.

A primary resource is the library's collection consisting of 2 million books, journals, and other materials from all parts of the world on all aspects of agriculture, including plant science, horticulture, forestry, animal industry, veterinary science, entomology, aquaculture, soil science, chemistry, biotechnology, food and nutrition, alternative farming, agricultural products, agricultural trade and marketing, and rural sociology.

A resource providing access to the agricultural literature at NAL and other locations is the AGRICOLA database prepared by NAL. With 2,600,000 citations AGRICOLA is available both online and on compact disk (CD-ROM).

User services range from reference and referrals to production of specialized bibliographies and computer database searches. General reference services are provided at the library or may be requested by regular mail, by electronic mail via DIALCOM system 57 (CSIN) mailbox AGS3099 or by system 41 (ALANET) ALA1030, or by telephone FTS 8-344-4479 or (301) 344-4479.

State-of-the-art technology has made available new products and services for preserving and delivering information and for instruction. NAL continues to develop expert advisory systems which help users obtain answers to questions, imitating human experts. Systems for the subjects of aquaculture, human nutrition, and herbs, among others, guide inquirers to relevant information.

The NAL is using a scanning system to convert printed text of agricultural publications to digitized code which is stored electronically on laser optical disks. The purpose is to provide indepth access to the literature of agriculture and at the same time preserve it from the rapid deterioration affecting most of the world's printed matter.

The full-text and associated graphics of some USDA and State Extension publications are available on digital videodisk. Each word of the text can be searched. The user can interact directly with a new computer-laser disk system called AGRICOLearn to learn how to search the AGRICOLA online database. The student works at his/her own pace, accessing only the parts of the course needed. Video pictures, graphics and voice provide interest.

Thirty-four thousand photos from the Forest Service Photograph Collection at NAL have been placed on a 12-inch laser videodisk. A search on an attached computer easily and quickly identifies photos on subjects, places, or persons of interest, bringing them up on the video screen. The originals need not be handled unless needed.

These "high tech" systems for the retrieval and preservation of agricultural information can be seen at NAL's New Technology Demonstration Center.

NAL has also established two software demonstration centers. One, in the Food and Nutrition Information Center, currently holds over 150 software programs for dietary analysis, food service, and nutrition and consumer education. The second holds about 70 software packages in other areas of agriculture and related subjects, including general purpose software with applications in the agricultural community.

The software is available for review and evaluation by NAL users. NAL provides a Current Awareness Literature Service (CALS) offering periodic computer searches of current literature to USDA scientists and researchers on a reimbursable basis. Searches are based on areas of interest as specified by requesting scientists and technicians.

Books, journal articles, and other materials are provided to USDA employees in response to job-related requests. Photocopies rather than loans of journal articles are supplied. NAL will also lend books and provide photocopies to other libraries according to standard interlibrary loan policies and procedures. Information on NAL products and services is available through Agricultural Library Forum (ALF), NAL's electronic bulletin board.

ALF supports messaging and conferencing, bulletins, and file transfer. Dial ALF on FTS 8-344-8510 or (301) 344-8510.

NAL conducts orientations and software or technology demonstrations upon request for those interested in learning how to use the library and its services. Call FTS 8-344-3778 or (301) 344-3778). Training programs in using AGRICOLA and other NAL products and services can be arranged for USDA employees. Call FTS 8-344-3875 or (301)344-3875.

58. COOPERATIVE EXTENSION SYSTEM

The Cooperative Extension System, a national educational network, links research, science, and technology to the needs of people where they live and work. The Extension's purpose is education—practical education for Americans to use in dealing with the critical issues that impact their daily lives and the Nation's future.

Extension education combines the expertise and resources of Federal, State, and local governments. The partners in this unique system are:

- The Extension Service at the U.S. Department of Agriculture.
- Extension professionals at land-grant universities throughout the United States and its territories.
- Extension professionals in nearly all of the Nation's 3,150 counties.

Thousands of paraprofessionals and nearly 3 million volunteers support this partnership and magnify its impact. Strong linkages with both public and private external groups are also crucial to the Extension System's strength and vitality.

The future of America depends, in part, on how well prepared people are to face critical issues. Extension's new agenda targets issues that address social, economic, and environmental concerns of people.

The Extension System recently identified nine national initiatives to provide a new focus for its educational efforts.

These first national initiatives are:

- Alternative Agricultural Opportunities
- Building Human Capital
- Competitiveness and Profitability of American Agriculture
- Conservation and Management of Natural Resources
- Family and Economic Well-Being
- Improving Nutrition, Diet, and Health
- Revitalizing Rural America
- Water Quality
- Youth at Risk

Nationwide, Extension professionals in agriculture, natural resources, home economics, human nutrition, rural and community development, and 4-H and youth programs focus their educational programs on these initiatives.

Through a new strategic planning and programming process, Extension will continue to address the critical concerns of Americans.

Communications and electronic technology are also crucial to Extension's future. Computer networks, electronic mail, satellite communications, and other emerging technologies already affect the way Extension delivers programs. Staffs nationwide will continue to use these and other applicable technologies to target audiences more efficiently and effectively.

The Cooperative Extension System celebrates its 75th anniversary this year.

Established in 1914, Cooperative Extension was designed as a partnership of the U.S. Department of Agriculture and the land-grant universities, which were authorized by the Federal Morrill Acts of 1862 and 1890. Legislation in various States has enabled local governments or organized groups in the Nation's counties to become a third legal partner in this educational endeavor.

Today, this educational system includes professionals in each of America's 1862 land-grant universities (in the 50 States, Puerto Rico, the Virgin Islands, Guam, Northern Marianas, American Samoa, Micronesia, and the District of Columbia) and in Tuskegee University and 16 1890 land-grant universities.

59. SMALL-SCALE AGRICULTURE

Small-scale agriculture implies people using alternative farm systems to earn some money. Small-scale agriculture, sometimes referred to as 'small farms,' constitutes a significant number of the Nation's 2.2 million farms, as noted in the Fact Book Introduction.

When farms grossing less than $40,000 annually are defined as "small," then more than 7 out of 10 U.S. farms are classified as small.

Awareness is growing that small-scale farmers make a significant contribution to the economic development of both agribusiness and consumer industries of rural communities throughout the United States. Some say such people are the "mortar" providing rural communities with social and economic strengths.

USDA's Office for Small-Scale Agriculture was created as part of the Cooperative State Research Service to increase and improve the flow of information about small-scale farming to agricultural producers and consumers. It is a focal point for distribution of USDA resources on this subject.

The office functions as a liaison to other USDA agencies such as the Extension Service and the Agricultural Research Service in identifying and directing research and educational programs to improve usefulness of information received by all small-scale farmers and others wishing to join their ranks.

Ongoing and planned activities of the office include:

- A quarterly newsletter on small-scale agriculture;
- Factsheets on small-scale agriculture;
- A national directory of small-scale agriculture contacts;
- An assessment of all ongoing USDA research and educational efforts that target on small-scale agriculture;
- Continual monitoring and/or implementing of conferences on small-scale agriculture.
- A 9-minute color video: "The Perfect Tomato, the Ideal Blackberry. Making Money in Small-Scale Agriculture." For sale at $10 per copy from the Photography Division, USDA Office of Information, Room 4404-South Building, Washington, DC 20250-1300.

60. AGRICULTURAL RESEARCH

Agricultural research provides new knowledge and technology to ensure an adequate supply of food and fiber for the Nation's population now and in the future. A basic goal of agricultural research is to establish low-input farmer cost to produce high-yielding quality commodities, enhance the environment, and conserve energy and natural resources.

Research has given farmers more control over nature, increased production, reduced production risks, and increased marketing efficiency. Research has led to the following:

- Genetically improved high-quality pest-resistant varieties of crops.
- Maintenance of an efficient and competitive agriculture in world trade, and improvement in U.S. capability for export of agricultural commodities.
- Development of new crops and of new uses for crops.
- Improved methods for conserving natural resources.
- Genetically improved livestock with higher reproduction rates.
- Efficient control of diseases, insects, nematodes, weeds, parasites, and other pests, including control of insects affecting humans and stored products.
- Control of livestock diseases and prevention of introduction of exotic diseases.
- Improved control of insects, ticks, and mites that affect livestock.
- Better plant and animal nutrition.
- Better nutritional quality in foods and added food safety.
- Improved irrigation equipment, principles, and practices.
- Improved farm equipment and mechanization practices.
- More efficient processing, transporting, and marketing of food.
- New and better fibers and fabrics.
- Improved levels of rural living.
- Support for programs of action and regulatory agencies.

The responsibility for much of the public segment of the agricultural research and development program lies with the Agricultural Research Service (ARS), USDA's Cooperative State Research Service (CSRS), and the land-grant college system of State agricultural experiment stations (SAES).

The interrelated and cooperative programs of USDA and SAES cover research locations in all 50 States and in the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, Micronesia, and the northern Marianas.

The primary intramural research agency of USDA, ARS is committed to a balanced program of fundamental and applied research that concentrates on problems that are high risk, long range, and national or regional in scope.

The ARS program plan defines six major objectives that develop the means for the following:

(1) managing and conserving the Nation's soil and water resources for a stable and productive agriculture;

(2) maintaining and increasing the productivity and quality of crop plants;

(3) increasing the productivity of animals and the quality of animal products;

(4) achieving maximum use of agricultural products for domestic markets and export;

(5) promoting optimum human health and well-being through improved nutrition and family resource management; and

(6) integrating scientific knowledge of agricultural production, processing, and marketing into systems that optimize resource management and facilitate transfer of technology to users.

The ARS program plan will ensure that USDA research complements and supports, rather than duplicates, efforts of other organizations within the agricultural research system.

Current agricultural research priorities in the national system are designed to meet the challenge of doubled food production, necessary if the world population forecast for the year 2000 is to be fed. These priorities include research on the following:

- Developing new and improved plant varieties. Scientists are identifying growth processes through the use of cell culture and are trying to improve plants and animals by genetic engineering. They are also using more conventional plant breeding and genetic techniques and are developing new hormonal or regulator control of plant and animal growth.
- Improving animal reproductive efficiency. Progress is being made toward improved reproductive efficiency of meat and dairy animals, including twinning and multiple births in cattle. Reproductive rates could increase 100 percent.
- Increasing animal production efficiency. Scientists are investigating ways to make maximum use of livestock feedstuffs such as forages and concentrates. In addition, research to exploit gene transfer through the use of recombinant DNA molecules may increase the value of animals as food. Research on methods to prevent, control, or eliminate infectious diseases, internal parasites, and external parasites such as insects, ticks, and mites can significantly increase the efficiency of livestock production.
- Using and preserving plant germplasm. Unique collections and repositories of information and materials, developed and maintained by ARS, are essential in meeting national and international research needs and are heavily used by other public and private research organizations. They include facilities for plant germplasm introduction and preservation, clonal repositories, disease-free seed stock, the ARS Culture Collection, and taxonomic collections of plants, microbes, and insects. Germplasm variability is imperative if breeders are to develop new, unique, and

productive crops for ensuring a stable, plentiful supply of food, feed, and fiber with desirable quality.

- Removing barriers to crop productivity. Barriers to increased production of major domestic and export crops are being removed through the development of stress-tolerant varieties. Crop and soil management systems and weather data systems have been improved to facilitate agricultural decisionmaking and to use plant nutrients from fertilizers and organic materials more efficiently.
- Conserving soil, water, and air. The goals of this research are to use water more efficiently, reduce pollution, improve fertilizer-use efficiency in plants, control erosion, restore productivity to eroded soils, and prevent water pollution.
- Reducing effects of soil erosion on soil productivity. Wind and water are slowly eroding our fertile topsoil. As the topsoil is depleted, the ability of the remaining soil to grow crops is reduced. Scientists are working to determine the impact that soil erosion has on crop production in this country and to develop ways to control erosion and restore productivity to eroded soils.
- Controlling water quality. Agricultural practices may lower downstream water quality. To prevent this, scientists across the country are developing and testing economical farm management practices to control water pollution from agriculture.
- Using energy efficiently. Scientists are developing systems to reduce the amount of energy used in agriculture. In addition to doing research on photosynthesis and nitrogen fixation, they are trying to increase fertilizer efficiency and find better methods for drying grain and curing peanuts and tobacco. Minimum tillage, irrigation efficiency, and increased forage production, are being studied.
- Increasing plant and animal resistance to pests and environmental stresses. Both plants and animals are subject to severe losses in productivity through stresses imposed by pests and adverse environmental factors. Losses can be markedly decreased by using improved cultural and management systems and genetically superior, stress-tolerant varieties and breeds.
- Developing new pest control technology. Even with today's sophisticated pest control technologies, more research is needed to reduce crop losses from insects and other pests. The role of insect migration in causing outbreaks is being studied along with the chemistry of host plant resistance to attack, animal host immunity to pests and diseases, insect pathogens for control of major insect pests, the fate of

fungicides in plants and animals, the regulation of insect hormone systems, the use of behavioral chemicals to increase effectiveness of beneficial insects, the development of new technology to control weeds, and the incorporation of all these components into a system of integrated pest management.

- Controlling animal losses from diseases, parasites, and toxicants. Diseases, internal and external parasites, and toxicants cause major losses of animals and are major contributors to low animal productivity. Research is needed to find new and improved methods of identifying losses, rapidly diagnosing recognized diseases, detecting inapparent carriers, and identifying new diseases. Recombinant DNA technology is expected to revolutionize the production of biological materials that are needed to prevent diseases or promote growth.
- Increasing photosynthesis. Scientists estimate that an increase of only 1 percent in photosynthetic efficiency would be of great importance in meeting food production goals.
- Improving the ability of plants to capture or fix nitrogen. Because all-out food production could result in a shortage of nitrogen fertilizer, scientists are working to find the best ways to use every pound of fertilizer and to improve the ability of certain plants to capture nitrogen from the air.
- Improving nutritional quality in certain crops. High-yielding cereals, legumes, and vegetables are sometimes deficient in nutritional content—protein, vitamins, minerals, and fiber. Improved quality in feed grains would come close to eliminating the need for high-protein supplements in animal feed rations, thus releasing protein for other uses. To provide a greater availability of vitamins and protein for the future, research will be valuable in increasing the nutritive content and improved blending of proteins of foods.
- Reducing food losses. Food losses occur at every level of the food chain, from production to home preparation to export. Scientists are developing biological methods to prevent and control such losses without harm to the quality and safety of the products. Additionally, by lessening the perils of transportation and distribution to perishable commodities, research expands the marketing window for exports.
- Producing more and better forage. Research on forage could lead to improving livestock production capabilities on more than 900 million acres of marginal lands. If vegetation can be increased by only threefold, this land will support

more than twice the number of cattle needed for the entire country.

Areas to be given special emphasis in 1989 include conserving, reclaiming, and efficiently using natural resources needed to sustain agricultural production; increasing the efficiency of animal and crop production systems; increasing the efficiency of processing, distributing, and marketing food and agricultural products to users and consumers; maintaining and improving systems to provide people with safe, nutritious, and esthetically pleasing food; and developing the means for integrating scientific knowledge into systems that optimize resource management and facilitate transfer of technology to users.

61. BIOTECHNOLOGY

Over the years, traditional agricultural research has released literally thousands of new plant cultivars, improved strains of livestock and poultry, and microorganisms such as pest control agents into the world. These releases have been subjected to extensive field testing under a variety of environmental situations, management practices, and product applications.

Biotechnologically modified plants, animals, and microorganisms to be used in agriculture, forestry, veterinary biologics, and the food industry will not differ fundamentally from such conventionally produced organisms, and will undergo similar rigorous evaluations.

The understanding of biological processes at the molecular level took a giant step forward in 1953 with the Nobel Prize-winning work of Watson and Crick on the structure of DNA (deoxyribonucleic acid). Their discoveries ushered in a new age of molecular biology, paving the way for the science of agricultural biotechnology.

The explosion of information about the cell includes gene transfer, cloning of DNA segments, sequencing of genetic components, and other manipulations involving recombinant DNA technology.

Oversight of organisms manipulated by recombinant DNA techniques is recognized as an extension of conventional biotechnology; that is, the application of biochemical, genetic, and immunological techniques.

The successful history of the safe experimentation with biotechnology-altered organisms in contained laboratories has been attributed to the recombinant DNA guidelines which were administered by the National Institutes of Health Recombinant DNA Advisory Committee (NIH-RAC). They provide guidance for biotechnology-based experimentation in a "contained" environment.

The USDA plans to follow the example of the NIH model for research biosafety review. However, because the responsibility for biotechnology within USDA resides with two assistant secretaries, there is need for a policy review mechanism. USDA has established a Committee on Biotechnology in Agriculture (CBA) to help the research and regulatory agencies make policy decisions. The committee is cochaired by the two assistant secretaries.

The Secretary of Agriculture has also established an Office of Agricultural Biotechnology (OAB) to promote and coordinate biotechnology-related activities within USDA.

These activities are divided into two areas:

(1) regulatory responsibilities which fall under the Assistant Secretary for Marketing and Inspection Services, and

(2) research responsibilities which fall under the purview of the Assistant Secretary for Science and Education.

Research agencies include the Agricultural Research Service (ARS), the Cooperative State Research Service (CSRS), and the Forest Service (FS).

The regulatory agencies include the Animal and Plant Health Inspection Service (APHIS), the Food Safety and Inspection Service (FSIS), and the Agricultural Marketing Service (AMS). Each agency has separate goals and missions.

There has also been established an Agriculture Biotechnology Research Advisory Committee (ABRAC), with important research oversight responsibilities, which works closely with the National Biological Impact Assessment Program. USDA is responsible for ensuring the safety of agricultural research including research on genetically modified organisms.

Within the tested and flexible framework of the NIH guidelines, USDA plans to follow the NIH-RAC administrative structure for reviewing biotechnology research. For example, if the guidelines require a review, the process for publicly supported research begins "at home" with researchers and their Institutional Biosafety Committee (IBC).

If a research proposal calls for further oversight, it moves to the Federal level and a committee of scientists, the Agricultural Biotechnology Research Advisory Committee (ABRAC). The work of this committee is similar to and consistent with the functions performed by the NIH-RAC.

USDA intends to publish proposed guidelines for biotechnology research in the Federal Register. Basically, they describe what information is needed for a Federal biosafety review and how the review will be conducted.

All federally funded biotechnology research will be subject to these guidelines, and USDA will encourage voluntary compliance by industry and other nonfederally funded organizations.

USDA's special concern is the plants, animals, and microorganisms traditionally used in agriculture and forestry.

A goal at USDA is the protection of American agriculture and society as a whole through responsible and fair regulations.

APHIS regulates the importation, interstate movement, and release into the environment of certain genetically engineered organisms and products.

Although APHIS believes that genetically altered organisms will play a major role in increasing plant yields and improving quality, APHIS also realizes that new breeds of plant pests could be released into the environment. To avoid such occurrences, APHIS has adopted a permit system for the introduction of genetically engineered products or organisms.

62. PESTICIDES AND INTEGRATED PEST MANAGEMENT

The Nation's food and fiber needs are now being met by only a small portion of the total work force of the Nation, thus freeing much of the work force needed to provide other goods and services that contribute to our high standard of living.

This would not be possible without methods to control many of an estimated 10,000 species of harmful insects, more than 1,500 diseases caused by micro-organisms, 1,800 different weeds that cause serious economic losses, and about 1,500 kinds of nematodes that damage crop plants.

USDA has expanded its efforts to develop and implement integrated pest management, an approach that uses a combination of techniques to control the wide variety of pests that threaten agricultural products. Integrated pest management involves appropriate reliance on natural pest population controls, usually in a combination of techniques that contribute the most economically effective suppression, including cultural methods, diseases that attack specific pests, resistant crop varieties, genetic methods, attractants, augmentation of parasites or predators, or chemical pesticides as needed.

Scientists in USDA's Agricultural Research Service (ARS) and in State agricultural experiment stations (SAES) are conducting research on the various components of integrated pest management to improve their use and application. Their investigations include land preparation and cultivation, crop rotations, fallow, timing of planting and harvesting, and timing of irrigation. They also look for ways to take advantage of a pest's natural enemies.

This approach, which is called biological control, has special importance for North America, where most farm pests are immigrants. The immigrant pests can proliferate unhindered, because they often cross the ocean without taking along their own natural enemies.

In its broad sense, biological control includes techniques such as sex pheromones that are used to lure insects to traps or other devices, or to prevent male and female insects from locating each other.

In its classical sense, biological control means using predators, parasites, and pathogens to combat plant pests.

Predators and parasites include insects, mites, and nematodes that naturally attack a target pest. Predators kill the pest outright. Parasites sap the target pest more slowly, gradually injuring or killing it.

Pathogens include bacteria, viruses, or fungi that cause diseases specifically injurious to a target pest.

In recent years, USDA's Animal and Plant Health Inspection Service (APHIS) has been developing a program specifically designed to use biological control in a broad-scale, organized manner. Targets include established pests as well as newly arrived ones.

Research scientists and State regulatory officials contribute ideas, which are reviewed annually by a Biological Control Technical Review Group. The group considers the severity of a pest problem, the likelihood that biological control can make a meaningful difference, and the chances that a known biological control agent (or a combination of different biological control agents) can handle the job. The group also makes sure solid evidence exists that the agents will not do inadvertent harm.

Success in biological control is illustrated by the campaign against the alfalfa weevil, which became established in the United States in 1905. It was targeted for biological control because it began taking up to half a billion dollars or more from the pockets of U.S. farmers each year.

ARS scientists saw promise in controlling the weevil with several species of tiny parasitic wasps from Europe. In the 11 States where ARS distributed the wasps between 1959 and 1979, the need to spray chemical insecticides on alfalfa fields dropped an average of 73 percent.

Some States reported virtually 100 percent protection from the weevil. The reduced need to spray has been saving farmers an average of $8 million year after year, while USDA spent only $1 million on the program over a 20-year period.

APHIS biological control specialists began spreading the parasitic wasps on an organized basis in 1981. After 4 years or more, farmers reduced spraying by 5.4 percent in a 13-State area according to a preliminary study by USDA's Economic Research Service. This generated savings of about 38 cents an acre. Applied to the estimated 12 million acres of alfalfa produced in the area, savings totaled as much as $4.4 million a year.

The benefits of biological control quickly outstripped the costs, and the benefits increased as the wasps became more firmly established.

Breeding resistant crops has been another successful control technique, especially against diseases and insects. USDA provides resistant germplasm, which is a vital source of breeding materials for providing specific varieties in State and industry programs.

Genetic methods being studied by USDA scientists include the sexual sterilization of insects and their release into a native insect population so that the normal insects mate with sterile insects and do not produce offspring. This method is extremely useful for suppressing low levels of some insect populations, such as the screwworm, over large areas.

Pesticides remain one of our major components in integrated pest management systems, as they are one of the most effective defenses against pests that affect our health and well-being and attack our crops, livestock, pets, and structures.

USDA scientists conduct studies to find ways to better utilize pesticides through improved timing and methods of application and use. They conduct research on the development of selective nonpersistent and biodegradable pesticides and on improved formulations of pesticides.

USDA scientists are also developing better methods for detecting and measuring pesticides and their metabolites to minimize pesticide residues.

Department scientists investigate the pathology, metabolism, and fate of pesticides in plants, animals, soils, air, and water. Emphasis is given to determining pesticide residues in plants and animals, modes of action, metabolic pathways of degradation, metabolic products formed, and the safe disposition of these products.

Because of limited sales potential, minor uses of pesticides do not provide sufficient economic incentive to warrant registration by the chemical industry. However, as these uses are often highly beneficial to the public, the Department carries out a program to assure that data is developed to support registration of pesticides for minor uses. This assures agricultural producers of continued availability of pesticides for minor uses, and assures the public of high-quality agricultural products. Because pesticides may cause undesirable effects if improperly used, the Department encourages the use of effective pest controls that provide the least potential hazard to human health, livestock, fish and wildlife, and to beneficial insects.

Persistent pesticides are not used in USDA pest control programs when an effective nonresidual method of control is available. When persistent pesticides are necessary, they are used in minimal amounts, applied precisely to the infested area and at minimally effective frequencies.

USDA scientists have developed technologies to remotely sense the presence and densities of pests. In addition, scientists have developed the use of computer-based models to assist growers in analyzing field data as a basis for making the best possible decisions in pest management.

Department scientists are developing ways to harmonize chemical pesticides with integrated pest management systems for a variety of farm commodities to complement farming or production systems. Scientists are also studying new methods of pest control, such as hormones that regulate the growth, development, and reproduction of insects and other invertebrates.

Hormones or insect growth regulators (IGRs) occurring naturally in low concentrations at various points in the life cycle of an insect, and related chemicals (analogs), can disrupt a wide range of body functions when applied at a critical time during the life cycle. IGRs represent a new class of pesticides that have great potential for application in pest management programs because they are narrow spectrum and biodegradable, and support environmental quality with relative safety.

Because of the important issues on the use of pesticides and pest control practices, the Department has conducted a National Pesticides Impact/Assessment Program since 1976. The primary purpose of this program is to coordinate and develop official USDA policy positions and viewpoints on pesticide and related issues.

The program is critical to American agriculture, because accurate, objective data is necessary to evaluate the effects of pesticide regulation in forestry and agricultural productivity and the quality and use of soil and water resources.

63. PLANT PROTECTION AND QUARANTINE

In most cases, plant pest problems are handled by farmers, ranchers, and other property owners and their State or local governments. However, when an insect, weed, or disease poses a particularly serious threat to a major crop, the Nation's forests, or other plant resources, Plant Protection and Quarantine (PPQ) of USDA's Animal and Plant Health Inspection Service may join in the control work.

Most pests and weeds that are targets of PPQ programs are not native to America. They gain entry into this country through commercial trade channels, international travelers, or other means. PPQ has the additional responsibility of preventing new introductions.

Agricultural quarantines are the first line of defense against foreign pests. Quarantines regulate the importation of materials that may harbor exotic insects, diseases, or weeds. For example, a tropical fruit may contain the eggs or larvae of a score or more of highly destructive fruit flies. The fruit usually cannot be brought into this country without a permit issued by PPQ, and the fruit may also be subject to inspection, treatment, and other safeguards to eliminate pest entry.

In fiscal 1988, PPQ inspectors at international ports of entry (along with cooperating Customs officers) inspected approximately 1,761,972 auto, rail, air, and ship arrivals carrying millions of pieces of luggage. Countless commercial shipments must be checked, as well as all ship and aircraft cargo and stores arriving from overseas. In fiscal year 1988, more than 899,860 interceptions of prohibited plant material were made from international travelers arriving by plane, ship, and land border crossings.

A large volume of prohibited animal products also is intercepted every year by PPQ inspectors. Such products could be the means of accidental introduction of costly foreign animal diseases such as African swine fever or foot-and-mouth disease (FMD).

History has shown that animal disease viruses most often gain entrance into a country through the medium of unprocessed international garbage. An extended outbreak of FMD could cost the United States $12 billion over a 15-year period and a loss of export markets. Unprocessed international garbage also could be source of introduction of plant pests such as the Mediterranean fruit fly. By ensuring that international garbage is properly processed by incineration or sterilization, PPQ is preventing the introduction of these animal diseases and plant pests.

When foreign plant pests do manage to slip through the quarantine barrier, PPQ conducts short-term operations—such as the Mediterranean fruit fly eradication project in California—to eradicate or control outbreaks. When pests are new to this country, control techniques may not be available. In any case, PPQ applies interstate quarantines and takes other steps to prevent spread until effective control measures can be developed.

In many cases, the foreign pests are only minor problems in their native lands because they are kept in check by native parasites, predators, and diseases. Since such natural enemies usually do not exist in the United States, one of PPQ's primary control techniques is the importation, rearing, and release of parasites and other biological control organisms. Other tools include pesticides, release of sterile insects, and cultural controls.

Control programs are designed with all safeguards needed to protect the health of people, domestic animals, crops, wildlife, and general environmental values. Whenever possible, nonchemical control methods are used. Each program is critically reviewed for its impact on the environment.

Much of the protection and quarantine work is jointly planned, financed, and executed with the affected States. An example of such cooperative effort is the computerized National Plant Pest Survey and Detection System, a nationwide network coordinated by PPQ. Under the system, universities, State departments of agriculture, agricultural experiment stations, and others can monitor pest populations and spot new outbreaks early.

Hemispheric cooperation is maintained through the North American Plant Protection Organization (NAPPO), involving the Canadian, Mexican, and U.S. plant protection organizations. NAPPO's objectives include control of pests of mutual concern or pests that pose an imminent threat to North American agriculture.

64. VETERINARY SERVICES

Protecting the health of the Nation's livestock, poultry, and other animals is the responsibility of Veterinary Services of USDA's Animal and Plant Health Inspection Service.

This team of trained veterinarians, animal health technicians, and other professionals has six primary tasks:

(1) keeping foreign diseases out of this country;

(2) eradicating outbreaks of those that get past our border defenses;

(3) fighting domestic animal diseases of economic significance;

(4) preventing interstate spread of diseases;

(5) safeguarding veterinary biologics;

(6) providing for the humane care of animals.

Disease control and eradication programs are carried out through close cooperation among the Federal and State governments, the veterinary profession, and the livestock and poultry industries.

The battle against livestock diseases began in 1884 when Congress created a special agency within USDA to combat bovine pleuropneumonia—a dread cattle disease that was crippling exports as well as taking a heavy toll of cattle in the Northeastern and Midwestern States.

Within 8 years, contagious bovine pleuropneumonia had been eradicated. This campaign set the pattern for subsequent disease control and eradication programs.

Diseases that have been eradicated in addition to bovine pleuropneumonia include foot-and-mouth disease, Texas cattle fever, dourine, glanders, fowl plague, Venezuelan equine encephalitis, sheep scabies, screwworms, exotic Newcastle disease, hog cholera, and lethal avian influenza.

Other diseases and parasites currently being combated by Veterinary Services include brucellosis, cattle fever ticks, scrapie in sheep, bovine tuberculosis, and pseudorabies in swine.

Disease control and eradication measures include quarantines to stop the movement of possibly infected or exposed animals, testing and examination to detect infection, destruction of infected (sometimes exposed) animals, treatment to eliminate parasites, vaccination in some cases, and cleaning and disinfection of contaminated premises.

In this era of rapid air and land travel, U.S. livestock are exposed to ever-increasing threats from exotic diseases. Import regulations administered by Veterinary Services are aimed at keeping out such dangerous diseases as foot-and-mouth disease, African swine fever, and rinderpest. Veterinary Services also certifies the health of export animals.

A special team of trained veterinarians and livestock inspectors has been established within Veterinary Services to respond immediately to any outbreak of a foreign animal disease.

Under the Virus-Serum-Toxin Act of 1913, Veterinary Services enforces regulations to ensure that animal vaccines and other veterinary biologics are safe, pure, potent, and effective.

Veterinary Services also enforces humane laws, including the handling of livestock transported by railroad; and care and treatment of animals used in research, the wholesale pet trade, and zoos and circuses.

In addition, the unit enforces the Horse Protection Act of 1970 (amended in 1976) prohibiting 'soring,' the use of cruel and inhumane practices to enhance the gait of show horses.

Veterinary Services programs are carried out by a field force of about 600 veterinarians and about 525 lay inspectors, plus about 250 laboratory technicians, working out of area offices (usually located in State capitals). Staff officials for the various programs are headquartered in Hyattsville, MD.

65. ANIMAL CARE

USDA's Animal and Plant Health Inspection Service (APHIS) enforces humane laws, including the Animal Welfare Act and the Horse Protection Act.

The Animal Welfare Act covers all warm-blooded animals, with certain exceptions (rats, mice, and birds). However, it specifically excludes domestic farm animals that are raised for food or fiber. This Act prescribes care and treatment for animals used in research, the wholesale pet trade, zoos and circuses, and while in commercial transportation.

The Horse Protection Act prohibits "soring," the use of cruel and inhumane practices to enhance the gait of show horses.

APHIS enforces the Animal Welfare Act through a system of licensing and registration of regulated businesses. This is coupled with inspections to ensure that licensees and registrants are complying with the standards for proper care and handling of animals covered by the Act.

The Horse Protection Act is enforced through inspections of horses at shows by APHIS personnel and by "Designated Qualified Persons" (DQP's), who are licensed by industry organizations and certified and monitored by APHIS.

Regulatory Enforcement and Animal Care (REAC) within APHIS is responsible for inspection and enforcement activities under both these laws. For the first time, APHIS has a regulatory enforcement and animal care group that works exclusively on those tasks. It is a new group that reports directly to the APHIS administrator. One of the purposes of establishing it was to make communications on animal care easier for regulated industries, interest groups, and the general public. Also, a separate unit provides better trained, full-time technical people to work in the area of animal care, which will result in greater uniformity in enforcing the laws.

66. ANIMAL DAMAGE CONTROL

The Animal Damage Control (ADC) program in USDA's Animal and Plant Health Inspection Service provides recommendations and direct assistance to government agencies and private individuals to help protect American agriculture from injury and damage caused by wild animals—including mammals, birds, and reptiles.

The operations effort is supported by a research laboratory that develops technically, scientifically, and ecologically sound methods to control damaging animals. Livestock, poultry, commercial fish, timber, grain, and vegetable crops are particularly vulnerable to damage by wild animals. Farm buildings, equipment, levies, roadways, and recreational sites are also subject to damage.

Most activities are conducted on a partnership basis with individuals and local, State, and Federal cooperators using matching funds to help pay for assistance. The program is carried out under the Animal Damage Control Act of 1931, which authorizes the Secretary of Agriculture to conduct investigations, experiments, and tests necessary in order to determine, demonstrate, and promulgate the best methods for controlling wild animals that are injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, birds, fish, and other domestic animals.

Virtually all species of wildlife can be harmful at times; but many of the serious loss problems are caused by introduced species—such as starlings, pigeons, and English sparrows—or by extremely adaptable species—such as coyotes, pocket gophers, and beavers.

Immature crops, mature grains, and young domestic animals are particularly vulnerable to damage. Control activities protect agriculture throughout all stages of production with emphasis on the periods of greatest vulnerability.

Wildlife damage control stations are strategically located throughout the country. These teams work to understand the causes of animal damage and to improve control techniques and strategies. Knowledge gained is used in control activities and is provided to the public through publications, seminars, and extension education courses.

Educational and operational assistance is provided in all States by a cadre of highly skilled wildlife biologists. Assistance depends on the level of cooperative involvement and extent of animal damage at the local level.

Program involvement in the Eastern States typically involves providing technical advice and assistance to agencies and individuals who, in turn, implement their own control efforts. In these States, most losses are attributable to concentrations of depredating birds, migratory waterfowl, field rodents, and both carnivorous and herbivorous mammals.

The Central and Western States tend to experience the greatest degree of losses and, accordingly, receive the greatest degree of ADC assistance. Employees provide technical assistance and are assigned to each State according to the level of cooperative support needed to conduct control activities. Losses to agriculture in these States are primarily attributable to predators, beavers, field rodents, and concentrations of depredating birds.

The ADC program deals with some 28 different kinds of loss affecting 43 agricultural crops, 24 types of livestock, 7 types of forestry/ranges, and about 18 types of property.

VIII. THE RURAL SOCIAL ENVIRONMENT

67. RURAL POPULATION

Today, the United States is primarily urban. People who live in large cities and their suburbs and in small towns of at least 2,500 population account for three-fourths of the total population. Rural people numbered about 63 million in 1986.

Although rural population increased from 1970 to 1980 after being rather stable for several decades, its proportion of the total population fell slightly because the urban population grew more rapidly. Farm residents now number about 5.2 million, and are a small minority even in the rural population.

The farm population has declined as the technological revolution has greatly reduced the workpower required in agriculture. Since 1970, the rural nonfarm population has grown by an amount greater than the loss of farm people.

Future losses in the farm population will be numerically small compared with those of the past, since the present population is more in line with the state of farming technology, and many farm people also work off the farm. However, the full impact of the current farm crisis is yet undetermined. Even with nonfarm growth, the total rural population is not likely to increase very much, because some rural communities become urban as they grow.

Rural population trends vary from one region to another. Over a broad area of the Great Plains, western Corn Belt, coastal plain Cotton Belt, and the southern coalfields, the rural population declined substantially from 1940 to 1970 because of major losses in agriculture and mining employment.

On the other hand, the rural population on the Pacific coast, in the Southwest, lower Great Lakes industrial belt, North Atlantic coast, southern Piedmont, and Florida Peninsula increased rapidly during this period.

After 1970, most rural counties that were losing population in the 1960's began to grow again because of job development, commuting, or retirement.

However, since 1980, low farm income conditions and a slump in mining and manufacturing employment have led to slow but widespread decline in rural and small town population. From 1980 to 1986, over half of all rural countries decreased in population.

68. AGE AND RACE

The median age of the rural population (32.4 years) is a little higher than that of the U.S. population as a whole (31.7 years). But migration has greatly altered the age composition in many rural areas.

In a number of Great Plains and Corn Belt counties affected by the drop in farm employment, the median age has risen to more than 40 years as young adults have moved away. In these areas, there are typically more people in their sixties than in their twenties. The needs, attitudes, and preferences of the elderly affect those communities more than elsewhere.

In other rural communities, however, the median age is in the late twenties because of higher birth rates or job development.

Except for American Indians, the great majority of blacks and other racial minorities live in urban areas. In the not too distant past, blacks were disproportionately rural and agricultural, but since 1940 they have moved to the cities in large numbers.

In the 1960's alone, the number of blacks and other racial minorities on farms dropped about 64 percent. The decline resulted from the near elimination of the sharecropping tenant system in cotton, peanut, and tobacco production in which many blacks had been engaged.

About 9 percent of the rural and small town population was black in 1980; 5 percent was Mexican-American, Indian, or other races.

69. NONMETROPOLITAN EMPLOYMENT

In 1987, 25 million people 16 years of age and over were in the nonmetropolitan civilian labor force, either employed or looking for work. Most were working, but an average of about 2 million persons were unemployed during the year.

Major changes have occurred in the nonmetro labor force in recent years.

Between 1979 and 1986, nonmetro employment shifted away from goods-producing industries, such as agriculture, construction, mining, and manufacturing, while the service-producing industries, such as retail trade, finance, insurance, real estate, other private services, and government, continued to expand.

In 1987, service-producing industries employed about 66 percent of the wage and salary workers in nonmetro areas, up from 62 percent in 1979. However, the goods-producing industries continued to be important employers, accounting for

35 percent of the wage and salary workers in 1987.

Also, recent years have seen large increases in the number of women entering the nonmetro labor force. By 1987, 52 percent of nonmetro women were participating in the labor force, up from 48 percent in 1979. The labor force participation rates of metro women increased similarly and by 1987 over 57 percent of metro women were in the labor force. Although both metro and nonmetro males participated at higher rates than women, their proportions in the labor force declined between 1979 and 1986.

Since 1980, unemployment rates have been higher in nonmetro than in metro areas. In 1987, annual average unemployment in nonmetro areas was 7.2 percent, compared with 5.9 percent in metro areas. However, these unemployment rates ignore those jobless people not actively seeking work because they feel jobs are unavailable (discouraged workers) and part-time workers who want full-time work. When the discouraged workers and half of the part-time workers unable to find full-time work are included, the adjusted unemployment rates increase to 11.3 percent in nonmetro areas and 8.7 percent in metro areas.

People who are often disadvantaged in the labor force—youth, women, and minorities—tend to be particularly disadvantaged in nonmetro areas. The average unemployment rate for teenagers aged 16 to 19 years is high in metro areas (16.1 percent) but much higher in nonmetro areas (19.6 percent). The metro-nonmetro difference in unemployment is much greater for women (5.9 percent versus 7.3 percent) than men (6.0 percent versus 7.1 percent). And the nonmetro unemployment rates for blacks and Hispanics are over 12 percent, much higher than in corresponding metro rates. Adjusted unemployment rates follow similar patterns, although the rates are much higher.

However, there are some indications that rural employment conditions are improving. Between 1986 and 1987, the nonmetro unemployment rate dropped by a full percentage point and over a quarter of a million people found jobs in nonmetro areas during the year. Although unemployment rates for nonmetro teenagers changed little, the rates for women, Hispanics, and blacks dropped by more than the nonmetro average. Preliminary data for the first half of 1988 suggested continued declines in unemployment in nonmetro areas during the year. And average employment growth in nonmetro areas, although modest, is expected to nearly equal that of metro areas during the next year.

It is still unclear whether these improvements reflect the beginning of a long-term rural recovery, or a partial, short-term gain. Any optimism must be tempered by the large concentration of nonmetro workers in low-growth, goods- producing industries; a nonmetro unemployment rate which is still considerably above the metro average; and continuing high unemployment rates for many subgroups of the nonmetro population.

70. RURAL INCOME AND POVERTY

Median family income has been consistently lower in nonmetro areas than in metro areas. During the late 1970's and early 1980's, little progress was made in narrowing this gap. In fact, by the mid-1980's the gap had widened.

In 1975, median income for nonmetro families ($11,600) was 22 percent below the metro median family income ($14,909). In 1987, the gap was over 26 percent between nonmetro ($24,397) and metro ($33,131).

Nonmetro areas also have a higher percentage of their population living below the poverty level. In 1975, 15.4 percent of the nonmetro population was poor, compared with 10.8 percent of the metro population. Betwen 1975 and 1978, nonmetro and metro poverty rates declined slowly to 13.5 and 10.4 percent. Both poverty rates climbed steadily betwen 1978 and 1983, and have since declined very slowly.

In 1987, 16.9 percent of nonmetro residents and 12.5 percent of metro residents were poor.

71. LOCAL GOVERNMENTS

In 1987, there were 91,186 units of local governments serving the Nation. As of 1986, these local governments employed the equivalent of 8.4 million full-time workers and spent over $427 billion for the provision of public services and the construction and maintenance of public facilities. The majority were located outside Metropolitan Statistical Areas (MSA's).

Over the last 25 years, local government activity has increased dramatically in metro and nonmetro areas alike. However, most of the growth occurred in the sixties and early seventies. During the late seventies and early eighties, inflation-adjusted spending per capita actually declined for the local government sector. Slow growth in the size of Federal and State intergovernmental aid programs, taxpayer resistance to tax increases, and the poor performance of the economy all acted to hold down the growth of local government spending.

The economic recovery helped raise local government revenues by 27 percent from 1982-85, while the cost of government purchases rose by only 16 percent. But many rural governments have not shared in this recovery. A 1987 survey found that 17 percent of rural counties experienced declining revenues from 1981-86. Another survey found over half of small cities anticipated revenue declines in fiscal year 1987.

In general, nonmetro governments continue to spend less per capita than do governments inside MSA's. As a result, debt burdens are lower and fewer dollars are collected for local government functions. Nonmetro governments rely heavily on intergovernmental transfers, particularly from the State government.

In 1982, 34 percent of the revenue raised by nonmetro governments came from the State (either as State aid, or as Federal aid passed through the State government), compared with 30 percent for metro areas.

Both user fees and utility charges have been consistently more important revenue sources in nonmetro than in metro areas. User fees in particular have grown in importance over the last decade.

In contrast, direct Federal aid has consistently been more important to local governments in metro than in nonmetro areas. With the end of General Revenue Sharing in 1986, many nonmetro governments now receive no direct Federal aid.

For many of the governments serving highly rural isolated areas (counties with no urban centers of their own and no close MSA) financial trends of the last decade have created problems much like those faced by large city governments.

Highly rural areas have high per capita property taxes, high tax effort (taxes in relation to income), and high vulnerability to cuts in intergovernmental aid, and have experienced rapid increases in per capita expenditures. Each of these characteristics is associated with potential financial problems.

72. FEDERAL FUNDING FOR RURAL AREA DEVELOPMENT

Federal funds going to rural areas and small towns grew about as rapidly in the early 1980's as did Federal funding to metropolitan areas. In 1985, Federal funds reaching nonmetro counties averaged $2,725 per person, up 27 percent from 1980. Funding to metro counties averaged $3,327, up 28 percent since 1980.

Federal funding includes payments, loans, and other transfers of money to support Federal, State, and local programs in agriculture, forest management, housing, transportation, education, health, public assistance, Social Security, veterans' benefits, defense, energy, and so on. It also includes interest on the national debt, but this has been excluded for analytic purposes. Figures on the metro-nonmetro distribution of funds are based on the 93 percent of Federal funds that can be reliably traced to county levels.

A larger share of nonmetro funding is in the form of loans and loan guarantees—9 percent compared with only 4 percent of metro funding. Loans must be repaid, so they have less value to the recipients than grants. Nonmetro counties also received a much larger share of their funds for income security programs, especially retirement and disability programs. Forty-two percent of nonmetro funds were for such programs, compared with 32 percent of metro funds.

Although nonmetro received less defense funding than metro areas, funding of nondefense programs in nonmetro and metro areas was almost identical in 1985. Excluding loans, nondefense funding going to nonmetro areas was $2,175 per person, compared to $2,181 per person in metro areas.

73. RECREATION

Recreation uses are getting more emphasis on both public and private lands. In fiscal year 1987, the National Forests, managed by USDA's Forest Service, furnished 238.5 million visitor-days of recreation (1 visitor-day equals 12 hours of an individual's recreation use).

People were attracted to the forests by more than 5,840 campgrounds and picnic areas, 316 swimming developments, 1,145 boating sites, and 330 winter sports sites. If all these facilities were fully occupied at the same time, they could accommodate 1.8 million persons.

The National Forest watersheds that provide most of the Nation's big river water supplies are also maintained by the Forest Service.

The Forest Service supervises mining and other surface activities in the National Forests and protects lands against fires and erosion. Activities such as these enhance hunting and fishing opportunities. In fiscal year 1987, the National Forests supplied 16.2 million visitor-days of fishing and 15.7 million of hunting.

Each year the Soil Conservation Service (SCS) assists thousands of landowners in applying conservation practices on the land. SCS helped landowners improve about 667,000 acres of recreation and wildlife land during fiscal year 1986.

In fiscal year 1987, SCS began construction of 6 new Public Law 83-566 small watershed projects, approved planning for 22 projects, authorized installation of 54 projects, and completed construction on or closed out 12 projects.

By the end of 1987, public recreation developments in 270 projects had been planned or completed in P.L. 566 small watershed projects in 43 States. This $500 million investment, with 50 percent being local funds, will provide more than 44 million visitor-days of recreation each year.

The developments include more than 145,000 surface acres of water and facilities for swimming, fishing, boating, waterskiing, camping, hiking, and picnicking.

In fiscal year 1987, work continued in the 190 areas authorized for assistance under the Resource Conservation and Development (RC&D) program. SCS provides leadership for these locally initiated, sponsored, and directed areas designed to conserve natural resources. In fiscal year 1987, RC&D measures completed numbered 1,025.

74. RURAL PUBLIC SERVICES

Rural local governments face special problems in providing services for their citizens. The following are rural characteristics that affect ways in which rural local governments provide services:

First, isolation, the geographic separation of rural areas from metropolitan centers, leads to low utilization rates for rural public services, inadequate response times for emergency services, and the detachment of service delivery professionals from their colleagues.

Second, low population density means higher per unit costs of some services and the inability to supply specialized help (for example, the handicapped) because the area cannot support the services for so few clients.

Third, the lack of fiscal resources puts many rural communities in a financial squeeze with resulting service deprivation for local residents.

Fourth, the lack of human resources, an adequate supply of trained personnel, has several implications for service delivery in rural communities. Critical functions may go understaffed, scarce employees are often overworked, service quality and quantity suffer, and long-range planning becomes difficult.

Isolated rural communities often suffer from medical services and facilities that are less adequate than those found in metro areas. Even if medical care services were evenly distributed across the Nation, and were of equal quality, it is likely that nonmetro residents with chronically low incomes would still have serious difficulty receiving adequate care in a complex medical system where access is based mainly on the ability to pay.

Because many rural governments are small and the communities lack resources, alternatives must be found for providing public services.

Improved health education might offset some of the problems of health care associated with isolation. Part of the evidence is that the principal causes of death in the Nation are heart disease, cancer, stroke, and accidents. It is argued that special educational efforts and supportive programs would be more effective in improving health than would incremental improvements in medicine. This assumes that pandemics and epidemics due to infectious agents have been largely eliminated, and that unhealthy, sedentary lifestyles have emerged as the chief villains causing needless morbidity and early deaths.

Additionally, some communities contract with private sector firms to provide important services. Additionally, 36 percent of rural localities contract out legal services to for-profit firms rather than perform such services themselves.

Some communities that want to attract new residents and businesses may find it beneficial to cooperate with other towns and share in the cost of furnishing services they cannot afford by themselves. Rural communities can work together in a variety of ways, and mutual aid is one way. Such an approach is commonly used for fire and police protection.

A second approach is for one community to sell a particular service to another. About 23 percent of isolated rural governments contract with another government for solid waste disposal, about 19 percent for the operation of libraries, and 18 percent for tax assessing.

Still another method of cooperation is joint action, especially for large projects such as building and operating hospitals or airports. Various methods of dividing costs and creating joint committees or governing boards are worked out for such projects.

Although most rural community residents do not enjoy the same level of public services available to urban area residents, much progress has been made improving some rural services in the last 20 years. Rising incomes and increased aid from higher level governments have made possible more and better programs for rural governments.

The management capacity of rural governments to plan and carry out these programs has improved. For example, in the sixties and seventies a nationwide system of multicounty substate regional agencies was developed to help rural communities plan for and manage their new population growth.

Still, the institutional base of rural governments is more fragile than that of urban areas, and these isolated governments remain more vulnerable to external changes than do metropolitan governments.

APPENDIX I. USDA TABLES OF AGRICULTURAL INFORMATION

These tables were prepared mainly by economists of USDA's Economic Research Service.

Table 18.—U.S. rural population, 1950, 1960, 1970, 1980, 1986, and 1988[1]

[In millions]

	Total	Nonfarm	Farm[2]
Previous farm definition:			
1950	54.5	31.5	23.0
1960	54.0	38.4	15.6
1970	53.9	44.2	9.7
Current definition:			
1980	59.5	53.4	6.1
1986	63.1[3]	57.9[3]	5.2
1988	64.8[3]	59.8[3]	5.0

[1] Rural population includes all persons living in the open country and in towns of less than 2,500 inhabitants.

[2] Farm under the previous definition consisted of persons on places of 10 or more acres if at least $50 worth of farm products were sold in the reporting year, and places under 10 acres with $250 worth of sales. Under the current definition, the farm population consists of persons living on places with sales of agricultural products of $1,000 or more.

[3] These estimates are from the Current Population Survey and are not fully comparable to the decennial census counts for earlier years.

Table 19.—U.S. agriculture's capacity to produce, 1951, 1956, 1961, 1966, and 1971-87

Year	Farms (thousands)		Farm population[1]		Work-hours[2]		Crops		Livestock		Overall
	Number	Change from preceding year	Thousands	Proportion of U.S. population (pct)	Total used (millions)	Output per work-hour index 1977 = 100	Production volume index 1977 = 100	Production per acre index 1977 = 100	Production volume index 1977 = 100	Production per breeding unit index 1977 = 100	Farm output 1977 = 100
1951	5,428	-220	21,890	14.2	18,300	24	60	59	73	68	63
1956	4,515	-140	18,712	11.1	15,200	31	63	64	79	73	69
1961	3,825	-138	14,803	8.1	11,800	44	70	78	86	84	76
1966	3,257	-99	11,595	5.9	9,200	59	73	83	91	91	79
1971	2,902	-47	9,425	4.6	7,500	85	86	96	100	98	92
1972	2,860	-42	9,610	4.6	7,600	83	87	99	101	100	91
1973	2,823	-37	9,472	4.5	7,500	86	92	99	99	97	93
1974	2,795	-28	9,264	4.4	7,500	81	84	88	100	96	88
1975[3]	2,521	([4])	8,864	4.2	7,300	90	93	96	95	92	95
1976	2,497	-24	8,253	3.9	6,900	97	92	94	99	98	97
1977	2,456	-41	7,806	3.6	6,900	100	100	100	100	100	100
1978	2,436	-20	6,501	3.0	6,900	104	102	105	101	102	104
1979	2,432	-4	6,241	2.8	6,800	113	113	113	104	104	111
1980	2,432	1	6,051	2.7	6,600	109	101	100	108	107	104
1981	2,434	1	5,850	2.6	6,600	123	117	115	109	108	118
1982	2,401	-33	5,628	2.4	6,400	125	117	116	107	108	116
1983	2,370	-31	5,787	2.5	6,700	99	88	100	109	112	96
1984	2,328	-42	5,754	2.4	6,365	121	111	112	107	113	112
1985	2,275	-53	5,355	2.2	5,872	139	118	120	110	120	118
1986	2,212	-63	[3]5,226	2.2	5,521	139	109	116	110	121	111
1987	2,173	-39	[3]4,986	[3]2.0	5,359	142	[5]106	[5]122	[5]113	[5]127	[5]110

[1] Starting 1978, based on new farm definition.

[2] Work-hours based on new labor series.

[3] New definition of farm began in 1975.

[4] Not available for 1975; change in farm definition precludes comparison with 1974 farm numbers.

[5] Estimated.

Table 20.—Agricultural prices, farm incomes, assets, and exports, 1951, 1956, 1961, 1966, and 1971-88

Year	Parity ratio[1]		in agriculture[2]	Assets of proprietors[2] [3]			Harvested crop acreage			
	Unadjusted (pct)	Adjusted (pct)	Farm operators' net income from farming	Total assets (billion dollars)	Total liabilities (billion dollars)	Proprietors' equities (billion dollars)	Total (million acres)	Domestic use per capita (acres)	For export (million acres)	Value of agricultural exports (million dollars)
			Aggregate (billion dollars)							
1951	107	108	15.9	170.1	14.6	155.5	344	1.73	59	3,411
1956	83	84	11.3	182.8	19.3	163.4	324	1.52	60	3,496
1961	79	83	12.0	219.3	28.5	190.9	302	1.26	67	4,946
1966	79	85	14.0	274.3	47.4	240.8	294	1.14	69	6,747
1971	71	75	15.0	351.8	59.6	292.2	305	1.17	62	7,955
1972	74	79	19.5	394.8	64.9	330.0	294	.97	91	8,242
1973	91	94	34.4	478.8	73.3	405.2	321	1.06	96	14,984
1974	86	87	27.3	502.7	81.8	420.9	328	1.07	99	21,608
1975	76	76	25.6	576.4	91.7	484.7	336	1.09	100	21,854
1976	71	72	20.2	590.4	97.0	493.5	337	1.10	97	22,760
1977	66	68	19.9	651.6	110.9	540.7	345	1.06	112	23,974
1978	70	72	25.2	777.2	127.4	649.7	338	1.00	114	27,289
1979	71	72	27.4	907.8	151.6	756.2	348	.99	125	31,979
1980	65	65	16.1	996.1	166.8	829.3	352	.94	137	40,481
1981	61	61	26.9	996.7	182.3	814.4	366	1.03	129	43,780
1982	57	58	23.5	961.2	189.5	771.7	362	1.07	113	39,097
1983	56	57	12.7	945.3	192.7	752.6	306	.77	124	34,769
1984	58	59	32.2	848.5	190.8	657.7	348	1.06	96	38,027
1985	52	55	32.2	749.0	175.2	573.8	342	1.10	81	31,201
1986	51	56	37.4	691.6	155.3	536.3	325	.95	95	26,312
1987	52	58	46.3	709.2	142.7	566.6	302	.80	106	27,876
1988[4]	54	61	41.9	751.0	138.0	613.0	297	.72	121	35,334

[1] Ratio of index of prices received to index of prices paid, interest, taxes, and wage rates—1910-14 = 100.
[2] Numbers based on new farm definition beginning in 1975.
[3] December 31 numbers, excluding farm households.
[4] Forecast.

Table 21.—Leading States, commodities, for cash receipts, including net CCC loans, 1987

(In millions of dollars)

Commodities	United States		States ranked by cash receipts									
	Rank	Value	1	2	3	4	5	6	7	8	9	10
Total		136,094	CA 15,522	TX 9,086	IA 8,780	NE 6,823	IL 6,174	MN 5,809	KS 5,722	FL 5,227	WI 5,017	IN 3,872
Livestock and poultry	1	76,218	TX 6,059	IA 5,270	NE 4,848	CA 4,741	WI 4,222	KS 3,914	MN 3,645	CO 2,321	PA 2,319	IL 2,262
Crops	2	61,876	CA 10,781	FL 4,125	IL 3,913	IA 3,510	TX 3,027	MN 2,165	IN 2,016	NE 1,975	WA 1,860	OH 1,808
Cattle and calves	1	33,829	TEX 4,587	NE 3,629	KS 3,420	CO 1,978	IA 1,952	OK 1,607	CA 1,552	SD 1,251	MN 1,149	MO 959
Dairy products	2	17,829	WI 2,969	CA 2,166	NY 1,419	PA 1,340	MN 1,220	MI 656	OH 608	TX 588	WA 472	IA 415
Hogs	3	10,326	IA 2,735	IL 1,062	MN 848	IN 786	NE 775	MO 579	NC 463	OH 396	SD 348	WI 289
Soybeans	4	9,565	IL 1,733	IA 1,689	IN 824	MO 808	MN 769	OH 741	NE 414	AR 369	KS 310	MS 238
Corn	5	8,807	IL 1,858	IA 1,664	NE 1,003	IN 884	MN 568	OH 501	MO 263	TX 241	WI 229	MI 196
Greenhouse and nursery	6	6,402	CA 1,464	FL 933	TX 444	PA 298	OR 210	NY 208	NC 199	NJ 192	MI 190	MD 176
Broilers	7	6,176	AR 1,107	GA 836	AL 738	NC 582	MS 415	MD 355	CA 341	TX 337	DE 320	VA 202
Wheat	8	4,869	KS 810	ND 701	MT 332	WA 299	OK 290	SD 238	TX 231	CO 221	MN 210	ID 199
Cotton	9	4,027	TX 980	CA 970	MS 532	AZ 339	LA 282	AR 270	TN 178	AL 109	MO 95	OK 90
Eggs	10	3,177	CA 308	GA 255	IN 240	AR 231	TX 192	NC 187	PA 174	AL 156	OH 145	FL 94

Hay	11	2,223	CA 522	CO 110	TX 106	PA 105	KS 96	AZ 91	ID 89	NM 69	MN 67	WA 66
Tobacco	12	1,827	NC 703	KY 441	SC 149	TN 129	GA 117	VA 114	MD 28	FL 23	CT 20	OH 18
Turkeys	13	1,701	NC 312	MN 228	CA 180	AR 118	VA 111	MO 109	IN 95	IA 68	PA 67	CO 53
Potatoes	14	1,588	ID 321	WA 227	CA 136	ME 108	FL 97	ND 80	OR 78	WI 73	CO 73	MN 60
Grapes	15	1,355	CA 1,200	WA 55	NY 41	AZ 21	MI 16	PA 15	GA 2	OH 2	AR 1	MO 1
Oranges	16	1,300	FL 862	CA 408	TX 12	AZ 11	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tomatoes	17	1,283	CA 560	FL 490	OH 34	TN 19	NJ 19	SC 18	IN 16	VA 15	PA 14	MI 13
Apples	18	1,091	WA 462	NY 82	MI 79	CA 63	PA 60	VA 54	NC 47	WV 22	OH 21	MA 18
Peanuts	19	1,016	GA 454	AL 135	TX 119	NC 112	VA 60	FL 58	OK 57	NM 10	SC 10	AZ 0
Sorghum grain	20	1,009	KS 317	TX 273	NE 165	MO 79	AR 44	OK 27	LA 19	IL 15	NM 14	CO 13
Sugar beets	21	942	CA 213	MN 204	ID 150	ND 115	MI 69	NE 45	MT 40	WY 37	CO 29	TX 20
Lettuce	22	857	CA 598	AZ 156	FL 44	CO 14	NY 10	NM 9	OH 6	TX 6	NJ 5	MI 4
Barley	23	782	ND 198	MT 137	ID 114	WA 65	MN 60	CA 39	CO 32	SD 31	OR 27	WY 15
Cane for sugar	24	778	FL 381	HI 218	LA 154	TX 25	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Almonds	25	616	CA 616	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

n.a. = not applicable

Table 22.—Income of farmers and farm people from all sources, 1945-87

(Updated data provided from 1976 onward.)

(In billions—unless otherwise noted)

Year	Cash receipts from marketings	Government payments to farmers	Gross cash income	Other income from farming[1]	Gross income before inventory adjustment[2]	Gross farm after inventory adjustment	Off-farm income[3] [7]	Total gross income all sources	Total production expenses	Net farm income before inventory[4] adjustment	Net farm income after inventory adjustment	Total for family personal spending and investment[5] [7]	Number farms (millions)[6]
1945	21.7	.74	22.4	3.4	25.8	25.4	.....	25.4	13.1	12.7	12.3	12.3	5.97
1946	24.8	.77	25.6	4.0	29.6	29.6	.....	29.6	14.5	15.1	15.1	15.1	5.93
1947	29.6	.31	29.9	4.2	34.1	32.3	.....	32.3	17.0	17.1	15.3	15.3	5.87
1948	30.2	.26	30.5	4.2	34.7	36.4	.....	36.4	18.8	15.9	17.6	17.6	5.80
1949	27.8	.19	28.0	3.6	31.6	30.7	.....	30.7	18.0	13.6	12.7	12.7	5.72
1950	28.5	.28	28.8	3.5	32.3	33.1	.....	33.1	19.5	12.8	13.6	13.6	5.65
1951	32.9	.29	33.2	4.0	37.2	38.4	.....	38.4	22.3	14.9	16.1	16.1	5.43
1952	32.5	.27	32.9	4.0	36.9	37.8	.....	37.8	22.8	14.1	15.0	15.0	5.20
1953	31.0	.21	31.3	3.9	35.2	34.6	.....	34.6	21.5	13.7	13.1	13.1	4.98
1954	29.8	.26	30.2	3.6	33.8	34.3	.....	34.3	21.8	12.0	12.5	12.5	4.80
1955	29.5	.23	29.8	3.5	33.3	33.5	.....	33.5	22.2	11.1	11.3	11.3	4.65
1956	30.4	.55	31.1	3.5	34.6	34.1	.....	34.1	22.7	11.9	11.4	11.4	4.51
1957	29.7	1.02	30.9	3.4	34.3	34.9	.....	34.9	23.7	10.6	11.2	11.2	4.37
1958	33.5	1.09	34.8	3.6	38.4	39.2	.....	39.2	25.8	12.6	13.4	13.4	4.23
1959	33.6	.68	34.6	3.5	38.1	38.1	.....	38.1	27.2	10.9	10.9	10.9	4.10
1960	34.0	.70	35.0	3.5	38.5	38.9	8.5	47.4	27.4	11.1	11.5	20.0	3.96
1961	35.2	1.49	36.9	3.6	40.5	40.8	9.2	50.0	28.6	11.9	12.2	21.4	3.83
1962	36.5	1.75	38.5	3.5	42.0	42.6	9.9	52.5	30.3	11.7	12.3	22.2	3.69
1963	37.5	1.70	39.5	3.6	43.1	44.0	11.0	55.0	31.6	11.5	12.4	23.4	3.57
1964	37.3	2.18	39.8	3.6	43.4	42.6	11.6	54.2	31.8	11.6	10.8	22.4	3.46
1965	39.4	2.46	42.2	3.7	45.9	46.9	12.7	59.6	33.6	12.3	13.3	26.0	3.36
1966	43.4	3.28	47.1	3.8	50.9	50.8	13.9	64.7	36.5	14.4	14.3	28.2	3.26
1967	42.8	3.08	46.4	4.0	50.4	51.1	14.5	65.6	38.2	12.2	12.9	27.4	3.16

Table 22—Income of farmers and farm people from all sources, 1945-87—Continued

(Updated data provided from 1976 onward.)

(In billions—unless otherwise noted)

Year	Cash receipts from marketings	Government payments to farmers	Gross cash income	Other income from farming[1]	Gross income before inventory adjustment[2]	Gross farm after inventory adjustment	Off-farm income[3] [7]	Total gross income all sources	Total production expenses	Net farm income before inventory[4] adjustment	Net farm income after inventory adjustment	Total for family personal spending and investment[5] [7]	Number farms (millions)[6]
1968	44.2	3.46	48.2	4.1	52.3	52.4	15.5	67.9	39.5	12.8	12.9	28.4	3.07
1969	48.2	3.79	52.5	4.3	56.8	56.9	16.6	73.5	42.1	14.7	14.8	31.4	3.00
1970	50.5	3.72	54.8	4.6	59.4	59.4	17.6	77.0	44.5	14.9	14.9	32.5	2.95
1971	52.7	3.14	56.5	4.8	61.3	62.6	19.1	81.7	47.1	14.2	15.5	34.6	2.90
1972	61.1	3.96	65.7	5.2	70.9	71.8	21.3	93.1	51.7	19.2	20.1	41.4	2.86
1973	86.9	2.61	90.2	6.0	96.2	99.6	24.7	124.3	64.6	31.6	35.0	59.7	2.82
1974	92.4	.53	93.7	6.9	100.6	99.0	28.1	127.1	71.0	9.6	28.0	56.1	2.80
1975	88.9	.81	90.7	10.9	101.6	105.0	23.9	128.9	75.0	26.6	30.0	53.9	2.52
1976	95.4	.70	97.2	6.8	104.0	102.5	26.7	129.2	82.7	21.3	19.8	46.5	2.50
1977	96.2	1.80	99.3	10.7	110.0	111.1	26.1	137.2	88.9	21.1	22.2	48.3	2.46
1978	112.4	3.00	117.3	13.1	130.4	132.3	29.7	162.0	103.2	27.2	29.1	58.8	2.44
1979	131.5	1.40	135.1	17.8	152.9	157.9	33.8	191.7	123.3	29.6	34.6	68.4	2.43
1980	139.7	1.30	143.3	8.3	151.6	145.3	34.7	180.0	133.1	18.5	12.2	46.9	2.43
1981	141.6	1.90	146.0	22.8	168.8	175.3	35.8	211.1	139.4	29.4	35.9	71.7	2.43
1982	142.6	3.50	150.6	17.4	168.0	166.6	36.4	203.0	140.0	28.0	26.6	63.0	2.40
1983	136.6	9.30	150.4	7.2	157.6	147.5	37.0	184.5	140.4	17.2	7.1	44.1	2.37
1984	142.4	8.40	155.2	24.0	179.2	185.5	38.9	224.4	142.7	36.5	42.8	81.7	2.33
1985	144.0	7.70	156.8	14.5	171.3	168.9	42.6	211.5	134.0	37.3	34.9	77.5	2.28
1986	135.1	11.80	152.0	12.9	164.9	162.1	44.6	206.7	122.3	42.6	39.8	84.4	2.21
1987	138.1	16.70	160.4	14.9	175.3	174.7	46.8	221.5	123.5	51.8	51.2	98.0	2.18

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[1] Predominantly noncash income gross value of farm products used on the farm, and a rental value for farm dwellings; also cash income from recreation, machine hire and custom work and forest product sales.

[2] Gross income from farming before adjustments for changes in value of farm inventory of crops and livestock. The next column does allow for an increase or decrease in value of inventories.

[3] Includes nonfarm wages, salaries, interest, dividends, rental property, unemployment compensation, social security, etc., but does not include capital gains income from off-farm sources.

[4] Includes gross income from farming after inventory adjustment.

[5] Net income from farming after change in value of farm inventory, plus off-farm income of farm operator families.

[6] Per farm numbers based on new farm definition beginning in 1977.

[7] Series began with 1960.

Table 23.—Wheat: Area, yield, supply, disappearance, and prices, 1960-88[1]

Year beginning June 1	Area (1,000 acres)		Yield per harvested acre (bu)	Supply (mil bu)				Disappearance (mil bu)			Prices received by farmers (dol per bu)
	Planted	Harvested		Beginning stock	Production	Imports[2]	Total	Domestic use	Exports[1]	Total	
1960	54,906	51,879	26.1	1,384	1,355	8	2,747	591	654	1,245	1.74
1961	55,707	51,571	23.9	1,502	1,232	6	2,741	604	716	1,320	1.83
1962	49,274	43,688	25.0	1,421	1,092	5	2,518	599	649	1,248	2.04
1963	53,364	45,506	25.2	1,270	1,147	4	2,421	581	846	1,427	1.85
1964	55,672	49,762	25.8	993	1,283	2	2,279	635	723	1,358	1.27
1965	57,361	49,560	26.5	921	1,316	1	2,238	725	852	1,577	1.35
1966	54,105	49,613	26.3	660	1,305	2	1,967	683	771	1,454	1.63
1967	67,264	58,353	25.8	513	1,508	1	2,021	626	765	1,391	1.39
1968	61,860	54,765	28.4	630	1,557	1	2,188	740	544	1,284	1.24
1969	53,450	47,146	30.6	904	1,443	3	2,350	764	603	1,367	1.25
1970	48,739	43,564	31.0	983	1,352	1	2,336	772	741	1,513	1.33
1971	53,822	47,635	33.9	823	1,619	1	2,442	849	610	1,459	1.24
1972	4,913	47,303	32.7	983	1,546	1	2,531	799	1,135	1,934	1.76
1973	9,254	54,148	31.6	597	1,711	3	2,311	754	1,217	1,971	3.95
1974	71,044	65,368	27.3	340	1,782	3	2,125	672	1,018	1,690	4.09
1975	74,900	69,499	30.6	435	2,127	2	2,584	726	1,173	1,898	3.55
1976	80,395	70,927	30.3	666	2,149	2	2,817	754	950	1,704	2.73
1977	75,710	66,686	30.7	1,113	2,046	2	3,161	859	1,124	1,983	2.33
1978	65,989	56,495	31.4	1,178	1,776	2	2,955	837	1,194	2,031	2.97
1979	71,424	62,454	34.2	924	2,134	2	3,060	783	1,375	2,158	3.78
1980	80,788	71,125	33.5	902	2,381	3	3,286	783	1,514	2,297	3.91
1981	88,251	81,013	34.5	989	2,785	3	3,777	847	1,771	2,618	3.69
1982	86,232	77,937	35.5	1,159	2,765	8	3,932	908	1,509	2,417	3.45
1983	76,419	61,390	39.4	1,515	2,420	4	3,939	1,116	1,429	2,540	3.51
1984	79,213	66,928	38.8	1,399	2,595	9	4,003	1,155	1,424	2,578	3.39
1985	75,575	64,734	37.5	1,425	2,425	16	3,866	1,046	915	1,961	3.08
1986	72,068	60,723	34.4	1,905	2,092	21	4,018	1,193	1,004	2,197	2.42
1987	65,834	55,960	37.7	1,821	2,107	16	3,945	1,092	1,592	2,684	2.57
1988	65,529	53,174	34.1	1,261	1,811	22	3,094	1,040	1,460	2,500	3.74

[1] 1988 preliminary

[2] Imports and exports include flour and other products expressed in wheat equivalent

Table 24.—Corn (grain only) Area, yield, supply, disappearance, and prices, 1960-87[1]

Marketing year[2]	Area (1,000 acres)		Yield per harvested acre (bu)	Supply (mil bu)				Disappearance (mil bu)			Prices received by farmers (dol per bu)
	Planted for all purpose	Harvested for grain		Beginning stock	Production	Imports[3]	Total	Domestic use	Exports[3]	Total	
1960	81,425	71,422	54.7	1,787	3,907	1	5,696	3,387	292	3,679	1.00
1961	65,919	57,634	62.4	2,016	3,598	1	5,615	3,527	435	3,962	1.10
1962	65,017	55,726	64.7	1,653	3,606	1	5,260	3,479	416	3,895	1.12
1963	68,771	59,227	67.9	1,365	4,019	1	5,385	3,348	500	3,848	1.11
1964	65,823	55,369	62.9	1,537	3,484	1	5,022	3,305	570	3,875	1.17
1965	65,171	55,392	74.1	1,147	4,103	1	5,251	3,722	687	4,409	1.16
1966	66,347	57,002	73.1	842	4,168	1	5,011	3,698	487	4,184	1.24
1967	71,156	60,694	80.1	826	4,860	1	5,687	3,885	633	4,518	1.03
1968	65,126	55,980	79.5	1,169	4,450	1	5,620	3,966	536	4,502	1.08
1969	64,264	54,574	85.9	1,118	4,687	1	5,806	4,189	612	4,801	1.16
1970	66,863	57,358	72.4	1,005	4,152	4	5,161	3,978	517	4,495	1.33
1971	74,179	64,123	88.1	667	5,646	1	6,314	4,392	796	5,187	1.08
1972	67,126	57,513	97.0	1,127	5,580	1	6,708	4,742	1,258	6,000	1.57
1973	72,253	62,143	91.3	708	5,671	1	6,380	4,653	1,243	5,896	2.55
1974	77,935	65,405	71.9	484	4,701	2	5,187	3,677	1,149	4,826	3.02
1975	78,719	67,625	86.4	558	5,841	2	6,401	4,090	1,678	5,767	2.54
1976	84,588	71,506	88.0	633	6,289	3	6,925	4,133	1,657	5,789	2.15
1977	84,328	71,614	90.8	1,135	6,505	3	7,643	4,298	1,909	6,207	2.02
1978	81,675	71,930	101.0	1,436	7,268	1	8,705	4,872	2,124	6,996	2.25
1979	81,394	72,400	109.5	1,710	7,928	1	9,639	5,189	2,415	7,604	2.52
1980	84,043	72,961	91.0	2,034	6,639	1	8,675	4,875	2,408	7,283	3.11
1981	84,097	74,524	108.9	1,392	8,119	1	9,512	4,966	2,010	6,975	2.50
1982	81,857	72,719	113.2	2,537	8,235	1	10,772	5,415	1,834	7,249	2.68
1982	60,217	51,483	81.1	3,523	4,175	3	7,701	4,793	1,902	6,694	3.25
1984	80,543	71,915	106.7	1,006	7,674	4	8,084	5,170	1,865	7,036	2.62
1985	83,448	75,224	118.0	1,648	8,877	11	10,536	5,255	1,241	6,496	2.23
1986	76,674	69,189	119.3	4,040	8,253	2	12,292	5,905	1,504	7,410	1.50
1987	65,704	59,208	119.4	4,882	7,072	4	11,958	5,964	1,735	7,699	1.94

[1] Revised data, 1979-82

[2] Marketing year beginning October 1, 1960 to 1974, September 1 marketing year 1975 to date.

[3] Grain and grain equivalent of corn products

Table 26.—Cotton (all kinds) Area, yield, supply, disappearance, and prices, 1964-88

Marketing year[1]	Area (1,000 acres)		Yield per harvested acre (pounds)	Supply (1,000 bales)				Disappearance (1,000 bales)			Prices received by farmers[2] cents per (pound)
	Planted	Harvested		Beginning stock	Production	Imports	Total	Domestic mill use[2]	Exports	Total	
1964	14,836	14,055	517	12,351	15,145	118	27,614	9,261	4,195	13,456	31.0
1965	14,152	13,613	527	14,249	14,951	118	29,318	9,596	3,035	12,631	29.3
1966	10,349	9,553	480	17,028	9,557	105	26,690	9,574	4,832	14,406	21.7
1967	9,450	7,997	447	12,344	7,443	149	19,936	9,077	4,361	13,438	26.7
1968	10,912	10,159	516	6,584	10,926	68	17,578	8,332	2,825	11,157	23.1
1969	11,882	11,058	434	6,544	9,990	52	16,586	8,114	2,878	10,992	22.0
1970	11,945	11,155	438	5,843	10,192	37	16,072	8,204	3,897	12,101	22.9
1971	12,355	11,471	438	4,203	10,477	72	14,752	8,259	3,385	11,644	28.2
1972	14,001	12,984	507	3,258	13,704	34	16,996	7,769	5,311	13,080	27.3
1973	12,480	11,970	520	4,221	12,974	48	17,243	7,472	6,123	13,595	44.6
1974	13,679	12,547	441	3,808	11,540	34	15,382	5,860	3,926	9,786	42.9
1975	9,478	8,796	453	5,708	8,302	92	14,102	7,250	3,311	10,561	51.3
1976	11,636	10,914	465	3,881	10,581	38	14,300	6,674	4,784	11,458	64.1
1977	13,680	13,275	520	2,928	14,389	5	17,322	6,483	5,484	11,967	52.3
1978	13,375	12,400	420	5,347	10,856	4	16,207	6,352	6,180	12,532	58.4
1979	13,978	12,831	547	3,958	14,629	5	18,592	6,506	9,229	15,735	62.5
1980	14,534	13,215	404	3,000	11,122	27	14,149	5,891	5,926	11,817	74.7
1981	14,330	13,841	542	2,668	15,646	26	18,340	5,264	6,567	11,831	54.3
1982	11,345	9,734	590	6,632	11,963	20	18,615	5,513	5,207	10,720	59.4
1983	7,926	7,348	508	7,937	7,771	12	15,720	5,926	6,786	12,712	66.4
1984	11,145	10,379	600	2,777	12,982	25	15,784	5,365	6,250	11,615	57.8
1985	10,685	10,229	630	4,102	13,432	33	17,567	6,399	1,969	8,359	56.3
1986	10,045	8,468	552	9,348	9,731	3	19,082	7,452	6,684	14,136	52.4
1987[3]	10,407	10,035	706	5,026	14,760	2	19,788	7,617	6,582	14,199	64.3
1988[3]	12,510	11,943	619	5,771	15,412	3	21,186	7,300	5,900	13,200	

[1] Marketing year beginning August 1

[2] Upland cotton, weighted season average price received by farmers

[3] Preliminary and estimated

Table 27.—Cattle and calves: Inventory numbers, calf crop, disposition, production, and prices, 1960-88[1]

Year	Inventory Jan. 1[2] (1,000 head)	Calf crop (1,000 head)	Inshipments (1,000 head)	Marketings[2] (1,000 head)		Farm slaughter[4] (1,000) head)	Deaths (1,000 head)		Production[5] (1,000 lb)	Marketings[3] (1,000 lb)	Price per 100 pounds (dollars)	
				Cattle	Calves	Cattle and calves	Cattle	Calves			Cattle	Calves
1960	96,236	39,355	13,477	34,254	12,034	1,195	1,567	2,533	28,795,880	35,722,510	20.40	22.90
1961	97,700	40,180	14,761	35,138	11,898	1,218	1,532	2,486	29,902,448	36,821,343	20.20	23.70
1962	100,369	41,441	16,583	36,403	12,182	1,194	1,583	2,542	30,774,859	37,668,858	21.30	25.10
1963	104,448	42,268	16,182	37,863	11,918	1,213	1,560	2,480	32,776,777	40,033,778	19.90	24.00
1964	107,903	43,809	15,595	40,280	12,552	1,242	1,595	2,637	34,836,138	42,655,520	18.00	20.40
1965	109,000	43,928	17,464	43,482	12,603	1,196	1,641	2,607	34,002,808	44,623,119	19.90	22.00
1966	108,862	43,537	18,624	45,038	12,488	665	1,625	2,424	34,949,625	46,284,623	22.20	26.00
1967	108,783	43,803	18,597	44,781	12,365	622	1,533	2,512	36,122,064	46,684,824	22.30	26.30
1968	109,371	44,315	19,509	45,860	12,742	568	1,527	2,485	36,530,247	47,494,093	23.40	27.60
1969	110,015	45,177	19,942	45,559	12,598	486	1,532	2,591	37,146,953	47,194,719	26.20	31.60
1970	112,369	45,871	20,059	46,926	12,036	462	1,583	2,714	39,342,987	49,459,720	27.10	34.50
1971	114,578	46,738	22,673	49,143	12,086	456	1,634	2,808	39,434,379	50,685,799	29.00	36.40
1972	117,862	47,682	24,831	51,043	12,164	503	1,780	3,346	41,225,193	53,141,798	33.50	44.70
1973	121,539	49,194	24,133	48,369	11,652	570	2,099	4,388	44,231,455	51,022,731	42.80	56.60
1974	127,788	50,873	18,103	48,383	9,514	729	2,006	4,104	42,760,575	50,208,435	35.80	35.20
1975	132,028	50,183	20,095	54,331	12,253	750	2,396	4,596	40,878,016	54,877,016	32.30	27.20
1976	127,980	47,384	21,238	54,410	12,525	722	1,821	3,369	41,368,299	57,169,770	33.70	34.20
1977	122,810	45,931	23,241	56,342	12,722	700	2,000	4,000	40,829,023	58,426,941	34.50	36.90
1978	116,375	43,818	23,573	54,622	11,952	550	1,940	3,860	39,766,559	57,381,035	48.50	59.00
1979	110,864	42,596	22,322	48,358	10,151	430	1,900	3,700	38,803,335	51,874,758	66.10	88.70
1980	111,242	44,938	20,513	46,026	10,502	401	1,795	3,618	40,283,777	50,210,836	62.40	76.80
1981	114,351	44,866	18,914	46,647	10,383	398	1,700	3,359	41,178,209	50,896,754	58.60	64.00
1982	115,444	44,200	21,289	49,549	10,560	395	1,843	3,586	40,714,722	53,272,291	56.70	59.80
1983	115,001	43,925	19,210	48,089	10,443	410	1,877	3,617	40,301,302	51,990,001	55.50	61.70
1984	113,700	42,500	20,515	50,862	10,253	388	1,873	3,591	40,030,471	54,644,756	57.30	59.90
1985	109,749	41,045	19,864	49,243	10,530	370	1,701	3,345	40,157,633	54,483,633	53.70	62.10
1986	105,468	41,201	21,211	49,963	10,498	351	1,738	3,300	40,464,719	55,398,117	52.60	61.10
1987	102,000	40,086	22,222	49,232	10,423	330	1,700	3,100	40,327,023	54,449,464	61.10	78.50
1988	99,524	40,872	22,324	48,076	10,248	286	1,651	2,975	40,897,874	53,897,458		
1989	99,484											

[1] Balance sheet estimates. Total of marketings, farm slaughter, deaths and onhand and of year equals total of births, inshipments, and onhand beginning of year. Includes Alaska and Hawaii beginning 1961.

[2] All cattle and calves.

[3] Excludes interfarm sales.

[4] Data for 1966 not comparable with previous years due to change in definition to include custom slaughtering in plants for farmers as part of the commercial meat production estimates beginning with January 1966. Combined beginning 1961.

[5] Adjustments made for inshipments and changes in inventory.

Table 28.—Hogs: Inventory numbers, pig crop, disappearance, and prices, 1964-88[1]

Year	Inventory Dec. 1[2] (1,000 head)	Pig crop (1,000 head)	Inshipments (1,000 head)	Marketings[3] 1,000 head)	Farm slaughter[4] (1,000 head)	Deaths (1,000 head)	Production[5] (1,000 lb)	Marketings[3] (1,000 lb)	Price per 100 pounds (dollars)
1960	59,028	88,216	2,500	79,831	5,114	9,223	19,203,234	18,622,151	15.30
1961	55,560	92,713	2,293	80,326	4,639	8,984	20,166,822	18,917,418	16.60
1962	56,619	93,608	2,639	81,743	4,093	9,037	20,274,620	19,310,335	16.30
1963	57,993	94,056	2,657	86,163	3,795	7,991	20,960,460	20,273,936	14.90
1964	56,757	87,544	2,718	86,088	3,269	6,872	20,216,732	20,487,965	14.80
1965	56,106	78,941	2,364	78,127	2,678	6,089	18,252,141	18,426,743	19.60
1966	50,519	87,604	2,489	75,761	1,375	6,351	19,148,989	17,773,114	23.50
1967	57,125	91,668	2,855	85,258	1,301	6,273	20,636,444	19,946,881	19.10
1968	58,818	94,156	3,181	87,728	1,262	6,338	21,034,221	20,381,499	18.50
1969	60,829	88,676	3,092	88,074	1,134	6,343	20,600,325	20,708,223	22.20
1970	57,046	101,714	3,211	86,919	1,235	6,532	21,822,826	20,347,354	22.70
1971	67,285	97,924	3,639	98,644	1,210	6,584	22,832,335	23,147,614	17.50
1972	62,412	90,574	3,360	89,555	1,158	6,617	20,918,802	20,922,577	24.10
1973	59,017	88,123	3,902	82,419	1,095	6,914	20,154,425	19,606,900	38.40
1974	60,614	83,744	3,979	85,504	1,321	6,819	19,976,384	20,299,581	34.20
1975	54,693	71,186	3,806	73,959	1,193	5,631	16,798,843	16,980,920	46.10
1976	49,267	84,395	4,191	75,744	1,175	6,001	18,110,651	17,085,365	43.30
1977	54,934	86,162	4,258	80,917	1,145	6,754	19,124,424	18,409,468	39.40
1978	56,539	88,442	4,713	81,428	1,099	7,067	19,610,887	18,749,389	48.60
1979	60,356	102,792	5,003	92,499	1,070	7,265	22,617,129	21,485,876	41.80
1980	67,318	101,720	4,668	100,651	1,100	7,494	23,401,728	23,473,775	38.00
1981	64,462	93,853	4,147	95,986	895	6,883	21,812,966	22,258,979	43.90
1982	58,598	85,189	3,827	86,972	655	5,552	19,657,921	20,154,962	52.30
1983	54,534	93,155	3,527	89,129	517	4,875	21,195,347	20,834,899	46.80
1984	56,694	86,586	3,527	87,344	473	4,917	20,195,699	20,490,921	47.10
1985	54,073	86,029	3,696	86,694	446	4,345	20,164,269	20,360,970	44.00
1986	52,313	82,283	3,463	86,608	358	4,133	19,362,696	19,362,696	49.30
1987	50,920	88,347	3,746	83,857	328	4,208	20,408,228	19,943,130	51.20
1988	54,620	92,583	3,676	90,476	341	4,746	21,630,015	21,642,574	42.30

[1] Balance sheet estimates. Total of marketings, farm slaughter, deaths, and onhand end of year equals totals of births, inshipments, and onhand beginning of year. Includes Alaska and Hawaii beginning 1981.

[2] All hogs and pigs. Beginning with 1965 number onhand is estimate as of December 1 previous year.

[3] Excludes interfarm sales.

[4] Data for 1966 not comparable with previous years due to change in definition to include custom slaughtering in plants for farmers as part of the commercial meat production estimates beginning with January.

[5] Adjustments made for inshipments and changes in inventory.

Table 29.—Sheep and lambs: Inventory numbers, lamb crop, disposition, production, and prices, 1960-88[1]

Year	Inventory Jan 1[2] (1,000 head)	Lamb crop (1,000 head)	Inshipments (1,000 head)		Marketings[3] 1,000 head)		Farm slaughter[4] (1,000 head)		Deaths (1,000 head)		Production[5] (1,000lb)	Marketings[3] (1,000lb)	Price per 100 pounds (dollars)	
			Sheep	Lambs	Sheep	Lambs	Sheep	Lambs	Sheep	Lambs			Sheep	Lambs
1960	33,170	21,012	608	5,491	3,572	19,068	119	222	2,458	2,132	1,628,014	2,083,980	5.60	17.90
1961	32,725	20,782	541	5,391	3,992	19,632	118	229	2,437	2,062	1,646,105	2,178,264	5.20	15.80
1962	30,969	19,712	636	5,198	3,788	18,783	113	218	2,430	2,007	1,490,722	2,074,148	5.63	17.80
1963	29,176	18,516	620	4,962	3,720	17,956	113	212	2,268	1,889	1,393,141	2,002,402	5.76	18.10
1964	27,116	16,994	736	4,838	3,437	16,757	107	193	2,265	1,797	1,330,507	1,860,420	6.00	19.90
1965	25,127	16,312	5,165		2,454	15,213	294		2,199	1,711	1,217,139	1,639,762	6.34	22.80
1966	24,734	15,881	4,679		2,785	14,674	268		940	1,674	1,249,097	1,651,261	6.84	23.40
1967	23,953	15,017	4,030		2,911	13,993	245		1,980	1,649	1,153,596	1,603,247	6.35	22.10
1968	22,223	14,443	4,035		2,298	13,448	237		1,789	1,580	1,166,190	1,487,480	6.58	24.40
1969	21,350	13,723	4,119		2,282	12,873	233		1,826	1,556	1,065,074	1,446,504	8.10	27.20
1970	20,423	13,465	4,032		1,983	12,840	249		1,638	1,478	1,099,385	1,435,918	7.52	26.40
1971	19,731	12,998	4,004		2,202	12,627	236		1,482	1,446	1,070,502	1,447,047	6.56	25.90
1972	18,739	12,599	3,976		2,170	12,383	224		1,417	1,480	1,004,102	1,411,461	7.26	29.10
1973	17,641	11,500	3,275		2,198	10,879	202		1,386	1,441	895,776	1,278,090	12.90	35.10
1974	16,310	10,509	2,629		2,172	9,888	217		1,248	1,409	806,755	1,177,539	11.20	37.00
1975	14,515	9,857	2,343		1,771	8,997	212		1,081	1,343	781,120	1,072,665	11.30	42.10
1976	13,311	8,888	2,466		1,445	8,071	197		983	1,202	732,765	961,780	13.20	46.90
1977	12,766	8,606	2,173		1,504	7,405	198		910	1,181	703,942	896,568	13.40	51.30
1978[6]	12,322	8,020	2,151		1,470	6,606	174		905	1,117	696,929	856,668	21.70	62.70
1979	12,365	7,974	2,143		1,347	6,336	172		867	1,063	704,593	806,765	25.70	66.70
1980	12,699	8,257	2,216		1,395	6,743	166		894	1,026	746,343	854,830	21.30	63.60
1981	12,947	8,820	1,885		1,510	7,103	189		818	1,035	772,382	885,634	21.20	54.90
1982	12,997	8,580	2,115		2,124	7,358	195		815	1,060	785,425	1,017,918	19.50	53.10
1983	12,140	8,209	1,838		1,820	7,140	171		674	934	767,553	966,515	15.70	53.90
1984	11,487	7,788	1,859		1,821	7,007	141		792	929	694,116	944,552	16.40	60.10
1985	10,443	7,412	1,693		1,569	6,478	135		544	839	694,217	868,942	23.90	67.70
1986	9,983	7,356	1,792		1,310	6,084	128		498	777	721,464	809,588	25.60	59.00
1987	10,389	7,190	1,814		1,232	6,024	113		503	736	728,863	799,111	29.50	77.60
1988	10,784	7,123	1,531		1,397	5,937	99		508	694	703,249	805,909	25.60	69.10

[1] Balance sheet estimates. Total of marketings, farm slaughter, deaths, and onhand end of year equals total of births, inshipments, and onhand beginning of year. Includes Alaska beginning 1961; Hawaii not available.

[2] All sheep and lambs

[3] Excludes interfarm sales

[4] Data for 1966 not comparable with previous years due to change in definition to include custom slaughtering in plants for farmers as part of the commercial estimates beginning with January 1966.

[5] Adjustments made for inshipments and changes in inventory

[6] Excludes inventory and supply and disposition items for Alabama, Arkansas, Delaware, Florida, Georgia, Mississippi, Rhode Island, and South Carolina, and is comparable to other supply and disposition items for 1978. Actual Jan. 1, 1978, inventory is 12,369,000 head

Table 30.—Milk: Supply, utilization, and prices, 1960-88[1]

Year	Average number of milk cows[2] (1,000 head)	Milk production per cow[3] (1b)	Supply (mil lb)				Utilization (mil lb)			Prices received by farmers for all milk (dol. per cwt)	Milk feed ratio[5]
			Beginning stocks	Production	Imports	Total	Domestic disap-pearance	Export and shipments[4]	Total		
1960	17,515	7,029	4,167	123,109	604	127,880	121,451	1,029	122,480	4.21	1.45
1961	17,243	7,290	5,400	125,707	760	131,867	121,032	932	121,964	4.22	1.45
1962	16,842	7,496	9,903	126,251	795	136,949	123,075	1,718	124,793	4.09	1.40
1963	16,260	7,700	12,156	125,202	915	138,273	123,092	5,493	128,585	4.10	1.36
1964	15,677	8,099	9,688	126,967	830	137,485	124,741	7,454	132,195	4.15	1.38
1965	14,953	8,305	5,290	124,180	923	130,393	123,579	2,358	125,937	4.23	1.40
1966	14,071	8,522	4,456	119,912	2,791	127,159	121,092	1,208	122,300	4.81	1.53
1967	13,415	8,851	4,859	118,732	2,908	126,499	117,423	824	118,247	5.02	1.55
1968	12,832	9,135	8,252	117,225	1,780	127,257	118,852	1,771	120,623	5.24	1.69
1969	12,307	9,434	6,634	116,108	1,621	124,363	117,699	1,419	119,118	5.49	1.74
1970	12,000	9,751	5,245	117,007	1,874	124,126	117,333	960	118,323	5.71	1.74
1971	11,839	10,015	5,803	118,566	1,346	125,715	117,585	3,026	120,611	5.87	1.71
1972	11,700	10,259	5,104	120,025	1,694	126,823	119,178	2,147	121,325	6.07	1.72
1973	11,413	10,119	5,498	115,491	3,860	125,849	119,350	1,292	120,642	7.14	1.46
1974	11,230	10,293	5,207	115,586	2,923	123,716	116,672	1,158	117,830	8.33	1.34
1975	11,139	10,360	5,886	115,398	1,669	122,953	118,063	1,046	119,109	8.75	1.40
1976	11,032	10,894	3,844	120,180	1,943	125,967	119,231	1,027	120,258	9.66	1.53
1977	10,945	11,206	5,709	122,654	1,968	130,331	120,713	992	121,705	9.72	1.57
1978	10,803	11,243	8,626	121,461	2,310	132,397	122,690	978	123,668	10.60	1.74
1979	10,734	11,492	8,729	123,350	2,305	134,384	124,765	1,020	125,785	12.02	1.80
1980	10,799	11,891	8,599	128,406	2,109	139,114	125,167	988	126,155	13.05	1.76
1981	10,898	12,183	12,959	132,770	2,329	148,058	125,897	3,783	129,680	13.77	1.72
1982	11,011	12,306	18,378	135,505	2,477	156,360	130,695	5,611	136,306	13.61	1.83
1983	11,098	12,585	20,054	139,672	2,616	162,342	135,931	3,765	139,696	13.58	1.72
1984	10,833	12,506	22,646	135,450	2,741	160,837	139,899	4,234	144,133	13.46	1.65
1985	11,016	12,994	16,704	143,147	2,776	162,627	143,561	5,371	148,932	12.75	1.73
1986	10,813	13,260	13,695	143,381	2,732	159,808	144,424	2,517	146,941	12.50	1.79
1987	10,329	13,802	12,867	142,557	2,490	157,914	147,438	3,036	150,474	1,254	1.86
1988	10,239	14,213	7,440	145,527	2,394	155,361	145,639	1,533	147,172	12.24	1.58

[1] Supply-utilization data, milk equivalent, fat solids basis.
[2] Average number on farms during the year; heifers that have not freshened excluded.
[3] Excludes milk sucked by calves.
[4] Includes sales for dollars, government-to-government sales P.L. 480, and AID programs. Exports only beginning 1988.
[5] Pounds of average concentrate ration equal in value to 1 pound of milk.

Table 31.—Number of farms and land in farms, by States, June 1, 1986-88[1]

State	Farms			Land in farms		
	1986	1987	1988[2]	1986	1987	1988[2]
		Number			*1,000 Acres*	
Alabama	51,000	49,000	49,000	11,000	11,000	11,000
Alaska	670	660	650	1,410	1,400	1,380
Arizona	8,600	8,400	8,100	37,200	37,000	36,500
Arkansas	50,000	49,000	47,000	15,700	15,400	15,000
California	79,000	78,000	78,000	32800	32,600	32,500
Colorado	26,600	27,000	27,300	34,200	34,000	33,700
Connecticut	3,800	3,700	3,700	450	440	440
Delaware	3,200	3,100	3,000	640	620	590
Florida	39,000	39,000	40,000	13,000	13,000	13,000
Georgia	49,000	48,000	49,000	13,300	13,000	13,000
Hawaii	4,400	4,300	4,400	1,950	1,950	1,950
Idaho	24,000	23,000	22,500	14,200	13,800	1,700
Illinois	86,000	84,000	83,000	28,700	28,600	28,600
Indiana	77,000	72,000	72,000	16,400	16,200	16,400
Iowa	109,000	107,000	107,000	33,600	33,500	33,500
Kansas	70,000	70,000	69,000	47,900	47,900	47,900
Kentucky	99,000	99,000	99,000	14,500	14,500	14,500
Louisiana	36,000	36,000	35,000	10,100	9,700	9,500
Maine	7,800	7,800	7,800	1,520	1,520	1,500
Maryland	17,000	16,500	16,000	2,500	2,450	2,350
Massachusetts	6,000	6,000	6,100	680	680	680
Michigan	60,000	58,000	58,000	11,300	11,300	11,200
Minnesota	93,000	92,000	94,000	30,000	30,000	30,000
Mississippi	46,000	45,000	43,000	14,000	13,800	13,500
Missouri	115,000	114,000	113,000	30,700	30,600	30,400
Montana	23,600	23,300	23,300	60,900	60,800	60,700
Nebraska	57,000	56,000	55,000	47,200	47,200	47,100
Nevada	2,400	2,400	2,400	8,800	8,800	8,800
New Hampshire	3,200	3,200	3,300	520	520	520
New Jersey	8,200	7,600	7,400	900	850	830
New Mexico	13,600	13,500	13,500	44,600	44,600	45,000
New York	42,000	40,500	40,000	8,700	8,600	8,500
North Carolina	73,000	72,000	70,000	10,800	10,800	10,500
North Dakota	33,000	32,500	32,500	40,700	40,500	40,400
Ohio	88,000	84,000	84,000	15,800	15,600	15,600
Oklahoma	71,000	70,000	69,000	33,000	33,000	33,000
Oregon	37,000	37,000	36,500	17,900	17,900	17,800
Pennsylvania	56,500	56,500	56,000	8,500	8,500	8,400
Rhode Island	750	750	750	73	73	72
South Carolina	27,000	26,000	26,500	5,400	5,200	5,300
South Dakota	36,000	35,000	34,500	44,500	44,300	44,100
Tennessee	96,000	96,000	94,000	13,000	12,600	12,800
Texas	162,000	160,000	156,000	134,000	133,200	132,000
Utah	13,700	13,600	13,300	11,400	11,300	11,300
Vermont	7,100	7,100	7,100	1,600	1,600	1,580
Virginia	50,000	50,000	49,000	9,600	9,600	9,600
Washington	38,000	38,000	37,000	16,100	16,000	16,000
West Virginia	21,000	21,000	20,500	3,700	3,700	3,600
Wisconsin	82,000	81,000	82,000	17,600	17,600	17,600
Wyoming	8,800	8,700	8,700	34,800	34,800	34,800
United States	2,211,920	2,176,110	2,158,800	1,007,643	1,002,603	998,692

[1] A farm is an establishment that as of June 1 sold or would normally have sold $1,000 or more of agricultural products during the year.

[2] Preliminary.

Table 32—Timberland area, timber growth, removals, and inventory, growth per acre, and forest productivity indexes for softwoods and hardwoods in the United States, by ownership and region, 1952-87 (1977 = 100)

Timber	Softwoods							Hardwoods					
Year	Land area million	Net annual growth	Annual removals	Total inventory	Annual growth per acre	Productivity Indexes		Net annual growth/	Annual removals	Total inventory	Annual growth per acre	Productivity Indexes	
Acres		Billion cubic feet			Cu. Ft.	growth/ inventory	removals/ inventory	Billion cubic feet			Cu. Ft.	growth/ inventory	removals/ inventory
						United States, all owners and regions							
1952	508	7.7	7.8	430	15.2	67	83	6.2	4.1	180	12.2	96	140
1962	518	9.6	7.6	448	18.5	80	78	7.1	4.3	210	13.7	94	128
1970	505	11.3	9.4	458	22.4	93	94	8.5	4.7	234	16.8	101	125
1977	491	12.4	10.0	465	25.2	100	100	9.3	4.2	260	19.0	100	100
1987	481	12.7	11.9	449	26.5	106	122	9.6	5.2	303	20.0	88	106
						Forest Industry							
1952	60	1.9	2.8	77	31.4	63	73	0.7	0.5	20	11.6	92	139
1962	62	2.3	2.3	76	37.8	79	62	0.8	0.7	25	13.5	88	142
1970	67	2.6	3.1	75	39.0	90	85	1.1	0.6	29	15.8	98	122
1977	69	2.9	3.6	74	41.7	100	100	1.2	0.6	32	17.5	100	100
1987	70	3.2	4.5	72	45.7	115	127	1.2	0.9	35	16.3	88	135
						Other Private							
1952	296	3.5	3.5	93	11.7	78	130	4.6	3.3	130	15.5	96	140
1962	304	4.3	3.0	103	14.2	89	102	5.1	3.4	148	16.8	94	128
1970	288	5.2	3.3	114	18.2	97	102	6.1	3.7	163	21.2	101	126
1977	278	5.9	3.6	123	21.1	100	100	6.6	3.2	180	23.9	100	100
1987	275	5.5	4.3	135	19.9	85	111	6.9	3.9	213	25.0	88	102
						National Forests							

1952	95	1.7	1.0	204	17.6	69	53	0.4	0.1	13	4.2	96	143
1962	97	2.0	1.7	214	20.6	79	85	0.5	0.1	17	5.2	97	122
1970	95	2.4	2.2	212	24.9	94	106	0.6	0.2	19	6.0	98	140
1977	89	2.5	2.0	208	27.8	100	100	0.7	0.1	21	7.3	100	100
1987	85	2.7	2.0	186	31.5	121	114	0.6	0.2	24	7.3	81	112
Other Public													
1952	58	0.7	0.4	55	12.6	67	52	0.5	0.1	16	8.5	97	107
1962	55	1.0	0.6	56	17.3	86	69	0.6	0.2	21	11.4	99	89
1970	55	1.1	0.8	58	20.0	97	89	0.7	0.2	24	13.4	101	106
1977	55	1.2	0.9	59	21.2	100	100	0.8	0.2	27	14.9	100	100
1987	51	1.4	1.0	56	27.1	123	122	1.0	0.2	31	19.0	100	90
South													
1952	204	3.6	3.1	59	17.9	97	116	3.0	2.6	84	14.9	86	164
1962	212	4.7	2.8	73	22.2	100	85	3.4	2.7	95	16.0	85	160
1970	204	5.6	3.8	87	27.6	102	96	4.3	2.7	104	21.0	98	148
1977	200	6.3	4.5	99	31.6	100	100	5.0	2.1	119	25.1	100	100
1987	195	5.8	5.7	104	30.1	88	123	4.6	3.0	134	23.5	81	125
West													
1952	150	3.1	4.0	344	20.8	63	77	0.4	0.0	19	2.6	81	51
1962	150	3.7	4.3	341	24.6	75	82	0.5	0.1	22	3.3	87	74
1970	147	4.4	5.0	332	29.7	91	99	0.6	0.1	26	4.1	94	90
1977	139	4.6	4.9	322	33.2	100	100	0.8	0.1	25	4.5	100	100
1987	133	5.6	5.4	299	42.1	130	119	0.9	0.2	31	6.4	109	146
North													
1952	154	1.0	0.6	27	6.3	100	145	2.7	1.5	77	17.8	110	116
1962	156	1.2	0.5	34	7.7	101	99	3.2	1.5	94	20.5	105	98
1970	154	1.3	0.6	39	8.7	96	95	3.6	1.9	105	23.3	105	106
1977	152	1.6	0.7	44	10.3	100	100	3.8	2.0	116	25.0	100	100
1987	153	1.3	0.7	47	8.4	76	96	4.2	2.0	138	27.2	93	86

Table 33.—Farm Security Act (Farm Program) loan rates, target prices, and deficiency payment rates, 1974-89 crops

Commodity	Unit	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Loan Rates																	
Corn	($/BU)	1.10	1.10	1.50	2.00	2.00	2.10	2.25/2.40[1]	2.40/2.55[1]	2.55/2.90[1]	2.65/2.65[1]	2.55	2.55	1.92	1.82	1.77	1.65
Sorghum	($/BU)	1.05	1.05	1.43	1.90	1.90	2.00	2.14/2.28[1]	2.28/2.42[1]	2.42/2.75[1]	2.52/2.52[1]	2.42	2.42	1.82	1.74	1.68	1.57
Barley	($/BU)	.90	.90	1.22	1.63	1.63	1.71	1.83/1.95[1]	1.95/2.07[1]	2.08/2.37[1]	2.16/2.16[1]	2.08	2.08	1.56	1.49	1.44	1.34
Oats	($/BU)	.54	.54	.72	1.03	1.03	1.08	1.16/1.23[1]	1.24/1.31[1]	1.31/1.49[1]	1.36/1.36[1]	1.31	1.31	.99	.94	.90	.85
Rye	($/BU)	.89	.89	1.20	1.70	1.70	1.70	1.90	2.04	2.17	2.25	2.17	2.17	1.63	1.55	1.50	1.40
Wheat	($/BU)	1.37	1.37	2.25	2.25	2.35	2.50	3.00/3.30[1]	3.20/3.50[1]	3.55/4.00[1]	3.65/3.65[1]	3.30	3.30	2.40	2.28	2.21	2.06
Upland Cotton	($/LB)	.2526	.3427	.3712	.4258	.4800	.5023	.4800	.5246	.5708	.5500	.5500	.5730	.5500	.5225	.5180	.5000
Rice	($/CWT)	7.54	8.52	6.19	6.19	6.40	6.79	7.12	8.01	8.14	8.14	8.00	8.00	7.20	6.84	6.63	6.50
Soybeans	($/BU)	2.25	.00	2.50	3.50	4.50	4.50	5.02	5.02	5.02	5.02	5.02	5.02	4.77	4.77	4.77	na
ELS Cotton	($/LB)	.4972	.6774	.7324	.7670	.8320	.9295	.9350	.9900	.9989	.9625	.8250	.8595	.8540	.8140	.8092	.8177
Flaxseed	($/BU)	2.50	.00	.00	.00	4.50[2]	4.50[2]	4.50[2]	.00	.00	.00	.00	.00	.00	.00	.00	.00
Honey	($/LB)	.208	.255	.294	.327	.368	.439	.503	.574	.604	.622	.658	.653	.640	.610	.591	na
Target Prices																	
Corn	($/BU)	1.38	1.38	1.57	2.00	2.10	2.20	2.35/2.05[3]	2.40	2.70	2.86	3.03	3.03	3.03	3.03	2.93	2.84
Sorghum	($/BU)	1.31	1.31	1.49	2.28	2.28	2.34	2.50/2.45[3]	2.55	2.60	2.72	2.88	2.88	2.88	2.88	2.78	2.70
Barley	($/BU)	1.13	1.13	1.28	2.15	2.25	2.40	2.55/2.29[3]	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.51	2.43
Oats	($/BU)	—	—	—	—	—	—	—	—	1.50	1.60	1.60	1.60	1.60	1.60	1.55	1.50
Wheat	($/BU)	2.05	2.05	2.29	2.90	3.40	3.40	3.63/3.08[3]	3.81	4.05	4.30	4.38	4.38	4.38	4.38	4.23	4.10
Upland Cotton	($/LB)	.3800	.3800	.4320	.4780	.5200	.5770	.5840	.7087	.7100	.7600	.8100	.8100	.8100	.7940	.7590	.7340
ELS Cotton	($/LB)	—	—	—	—	—	—	—	—	—	—	.9900	1.0314	1.0248	.9770	.9570	.9870
Rice	($/CWT)	—	—	8.25	8.25	8.53	9.05	9.49	1.88	1.85	11.40	11.90	11.90	11.90	11.66	11.15	1.80
Deficiency Payment Rates																	
Corn	($/BU)	.00	.00	.00	.00	.00	.00	.00	.00	.15	.00	.43	.48	1.11[4]	1.09	.36	.89
Sorghum	($/BU)	.00	.00	.00	.00	.31	.13	.00	.27	.18	.00	.46	.46	1.06[4]	1.14	.48	.90
Barley	($/BU)	.00	.00	.00	.50	.36	.11	.00	.11	.40	.21	.26	.52	.99[4]	.79	.00	.23
Oats	($/BU)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.11	.00	.25	.39[4]	.20	.00	.00
Wheat	($/BU)	.00	.00	.00	.65	.52	.00	.00	.15	.50	.65	1.00	1.08	1.98[4]	1.81	.69	.50
Upland Cotton	($/LB)	.00	.00	.00	.00	.00	.00	.00	.787	.1392	.1210	.1860	.2370	.2600[4]	.1730	.1940	.2140
Rice	($/CWT)	.00	.00	1.70	.00	.78	.00	.00	.28	2.71	2.77	3.76	3.90	4.70[4]	4.82	4.31	4.30
ELS Cotton	($/LB)	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.1414	.1408	.00	.00	.00

[1] The first entry is the regular loan rate; the second entry is the Farmer-Owned Reserve loan rate.

[2] Purchase program only

[3] The first entry is the target price applicable to those producers who planted within the farm NCA; the second entry is for those who planted in excess of the farm NCA.

[4] Maximum level

Source: Agricultural Stabilization and Conservation Service.

APPENDIX II
METRIC CONVERSION CHART

Measurement	To convert this	To this	Multiply by
LENGTH	inches	millimeters (mm)	25.4
	feet	centimeters (cm)	39.
	yards	meters (m)	.91
	miles	kilometer (km)	1.61
	millimeters	inches	.04
	centimeters	inches	.4
	meter	yards	1.1
	kilometer	miles	.6
WEIGHT	ounces	grams (g)	28.
	pounds	kilograms (kg)	.45
	short tons	metric tons (t)	.9
	kilograms	pounds	2.2
	metric tons	Short ton	1.1
AREA	square inches	square centimeters (cm^2)	6.5
	square feet	square (m^2)	.09
	square miles	square kilometers (m^2)	2.6
	acres	hectares (ha)	.4
	square centimeters	square inches	.16
	square meter	square yards	1.2
	square kilometers	square miles	4
	hectares	acres	2.5
VOLUME	teaspoons	milliliters (ml)	5.
	tablespoons	milliliters (ml)	1 5.
	fluid ounces	milliliters (ml)	30.
	cups	liter (1)	.24
	pints	liter (1)	.47
	quarts	liters (1)	.95
	gallons	liters (1)	3.8
	cubic feet	cubic meter (m^3)	.03
	cubic yards	cubic meters (m^3)	.76
	milliliters	fluid ounces	.03
	liter	pints	2.1
	liters	quarts	1.06
	liters	gallons	.26
	cubic meters	cubic feet	35.
	cubic meters	cubic yards	1.3
TEMPERATURE	Fahrenheit	Celsius (°C)	.56[1]
	Celsius	Fahrenheit	1.82[2]

FARM PRODUCTS	pounds per acre	kilograms per	1.14
	short tons per acre	hectare (kg/ha)	2.25
	kg/ha	metric tons per	.001
		hectare (t/ha)	
	kg/ha	pounds per acre	.88
	t/ha	short tons per acre	.44
	t/ha	kg/ha	1000.

[1] After subtracting 31.

[2] Then add 32.

1 BUSHEL OF...

—wheat, soybeans, potatoes	= 60 lbs. X .45 = 27 kg.
—corn, gr. sorg., rye, flaxseed	= 56 lbs. X .45 = 25 kg.
—beets, carrots	= 50 lbs. X .45 = 23 kg.
—barley, buckwheat, peaches	= 48 lbs. X .45 = 22 kg.
—oats, cottonseed	= 32 lbs. X .45 = 14 kg.

1 METRIC TON OF...

—wheat, soybeans, potatoes	= 2,204.6 lbs. ÷ 60lbs. = 36.74 bu.
—corn, gr. sorg., rye, flaxseed	= 2,204.6 lbs. ÷ 56lbs. = 39.37 bu.
—beets, carrots	= 2,204.6 lbs. ÷ 50lbs. = 44.09 bu.
—barley, buckwheat, peaches	= 2,204.6 lbs. ÷ 48lbs. = 45.93 bu.
—oats, cottonseed	= 2,204.6 lbs. ÷ 32lbs. = 68.89 bu.

APPENDIX III. GLOSSARY

ACREAGE ALLOTMENT. The individual farm's share, based on its previous production of the national acreage needed to produce sufficient supplies of a particular crop. Allotments currently apply only to tobacco.

ADJUSTED BASE PERIOD PRICE. The average price received by farmers in the most recent 10 years, divided by the index (1910-14 = 100) of average prices received by farmers for all farm products in the same 10 years. Used in parity calculations.

AGRIBUSINESS. Producers and manufacturers of agricultural goods and services, such as fertilizer and farm equipment makers, food and fiber processors, wholesalers, transporters, and retail food and fiber outlets.

ALTERNATIVE FARMING SYSTEMS. Many farmers seek alternatives to the energy- and chemical-intensive monoculture food and fiber production systems that became the norm after World War II. Strategies include using animal and green manure, integrated pest management, reduced tillage, crop rotations—especially with legumes—adding alternative crops or diversifying the farm enterprise. See related terms: LOW-INPUT FARMING and ORGANIC FARMING.

ANIMAL UNIT. A standard measure based on feed requirements used to combine various classes of livestock according to size, weight, age, and use.

AQUACULTURE. The propagation and rearing of aquatic species in a controlled or selected environment.

ATTAINABLE YIELD. Yields expected through the use of known technology. See YIELD, ECONOMIC MAXIMUM.

AUTOIMMUNITY. A condition in which the body mounts an immune response against one of its own organs or tissues.

BASE PERIOD PRICE. The average price for an item in a specified time period used as a base for an index such as 1910-14, 1957-59, 1967, 1977.

BASIC COMMODITIES. Six agricultural crops (corn, cotton, peanuts, rice, tobacco, and wheat) declared by legislation as requiring price support.

BIOCHEMICAL. The product of a chemical reaction in a living organism.

BIOLOGICAL CONTROL OF PESTS. Control, but not total eradication, of some weeds and insect pests can be achieved by employing the natural enemies, either indigenous or imported, or diseases to which the pest is susceptible. More research is being done to identify appropriate organisms and to fully exploit them. Biological control also uses such nontoxic pesticides as Bacillus thuringiensis (Bt).

BIOTECHNOLOGY. No official government definition has been agreed upon. One widely accepted definition follows: The use of micr-organisms, plant cells, animal cells, or parts of cells, such as enzymes, to produce products or carry out processes. (Also see GENETIC ENGINEERING.)

BREEDING UNIT INDEX. A measure of a breeding herd, including the total number of female animals capable of giving birth, weighted by the production per head, in a base period.

Bt. A protein produced by the Bacillus thuringiensis microbe. When ingested by certain caterpillars, it becomes toxic and kills them. Bt is routinely sprayed around homes or commercial areas to control insect pests.

CARRYOVER. The volume of a farm commodity not yet used at the end of a marketing year. It is the remaining stock carried over into the next year. Marketing years generally start at the beginning of the new harvest for a commodity and extend to the same time in the following year.

CASEIN. The major portion of milk protein. It is manufactured from skim milk and is usually marketed in dry form. Food grade casein is used in processed foods, and industrial grade casein is used in making glue, paint, and plastics.

CASH GRAIN FARM. A farm on which corn, grain sorghum, small grains, soybeans, or field beans and peas account for at least 50 percent of the value of products sold.

CELL. The smallest structural unit of living organisms that is able to grow and reproduce independently.

CELL CULTURE. Growth of cells under laboratory conditions.

CENSUS OF AGRICULTURE. A count taken by the Bureau of Census every 5 years of number of farms, land in farms, crop acreage and production, livestock numbers and production, farm spending, farm facilities and equipment, farm tenure, value of farm products sold, farm size, type of farm, and so forth. Data is obtained for States and counties.

CHROMOSOMES. Threadlike components in the cell that contain DNA and proteins. Genes are carried on chromosomes.

CLIMATE. The sum total of all atmospheric or meteorological influences, principally temperature, moisture, wind, and evaporation which combine to characterize a region and give it individuality by influencing the nature of its soils, vegetation, and land use.

CLONE. A group of genes, cells, or organisms derived from a common ancestor. Because there is no combining of genetic material (as in sexual reproduction), the members of the clone are genetically identical to the parent.

COMPLEMENTARY DNA (cDNA). DNA synthesized from a messenger RNA rather than from a DNA template. This type of DNA is used for cloning or as a DNA probe for locating specific genes in DNA hybridization studies.

COMPLEMENTARY IMPORTS. Agricultural import items not produced in appreciable commercial volume in the United States. Examples: Bananas, coffee, rubber, cocoa, tea, spices, and cordage fiber. See SUPPLEMENTARY IMPORTS.

CONSERVATION, SOIL. A combination of land use and practices to protect and improve soil productivity and to prevent soil deterioration from erosion, exhaustion of plant nutrients, accumulation of toxic salts, excessive compaction, or other adverse effects. See LAND CAPABILITY and SOIL.

CONSERVATION TILLAGE. Any of several farming methods that provide for seed germination, plant growth, and weed control yet maintain effective ground cover throughout the year and disturb the soil as little as possible. The aim is to reduce soil loss and energy use while maintaining crop yields and quality.

CONTOUR FARMING. Field operations such as plowing, planting, cultivating, and harvesting on the contour, or at right angles to the natural slope, to reduce soil erosion, protect soil fertility, and use water more efficiently.

CONTRACT PRODUCTION. Producing crops or livestock under an agreement to deliver specified goods and services in certain quantities and of certain quality at a later time.

COOPERATIVE EXTENSION SERVICE. Educational work for people outside of classrooms carried on by the States, usually through the resources of the land-grant colleges and universities in cooperation with the U.S. Department of Agriculture. The Extension Service staff, U.S. Department of Agriculture, represents the Department in conducting cooperative Extension work.

CORN-HOG RATIO. Number of bushels of corn that are equal (in value) to 100 pounds of live hogs; that is, the price of hogs per hundredweight divided by the price of corn per bushel. Can be calculated in terms of U.S. average prices received by farmers or prices received by farmers in a given area or on the basis of central market prices rather than farm prices. This ratio has exhibited both seasonal and cyclical movements.

CORPORATION FARM. A farm that is legally incorporated; can be of any size, including family farms.

COST OF PRODUCTION. The average amount in dollars per unit used in growing or raising a farm product, including all purchased inputs and sometimes including allowances for management and the use of owned land. May be expressed on a unit, a per-acre, or a per-bushel basis for all farms in an area or in the whole country.

COUNTY EXTENSION AGENT. A professional worker, jointly employed by the county, State Cooperative Extension Service, and the U.S. Department of Agriculture, to bring agricultural and homemaking information to local people and to help them meet farm, home, and community problems. Also called extension agent, farm and home adviser, agricultural agent, extension home economist, and 4-H or youth agent. See COOPERATIVE EXTENSION SERVICE.

COVER CROP. A close-growing crop grown primarily to protect and improve soil between periods of regular crops, or between trees and vines in orchards and vineyards.

CREDIT, SUPERVISED. A technique of providing loans in adequate amounts combined with intensive supervision provided by a management supervisor to help family farmers achieve successful commercial farm operations.

CROSS-COMPLIANCE. A Government farm program term meaning that if a farmer wishes to participate in a program for one crop by meeting the qualifications for production adjustment payments and loans for that crop, the farmer must also meet the program provisions for other major program crops that the farmer grows.

CULTURE. Used as a noun, cultivation of living organisms in a prepared medium; used as a verb, to grow in prepared medium.

CUSTOM WORK. Specific farm operations performed under contract between the farmer and the contractor. The contractor furnishes labor, equipment, and materials to perform the operation. Custom harvesting of grain, spraying and picking of fruit, and sheep shearing are examples.

DATABASE. A collection or file of records containing information in electronic form, accessed via computer.

DEFICIENCY PAYMENTS. Funds paid to farmers when farm prices are below the target price arrived at by subtracting from the target price the higher of (1) the loan rate, or (2) the national average market price of a commodity during specified portions of the marketing year. Generally, the Federal Government pays this difference to a farmer who qualifies (by meeting all farm program conditions) for that portion of the farmer's production specified in the farm program.

DIALDEHYDE STARCH. A chemical derivative of starch derived from cereal grains used to improve wet strength of paper products and tanning leather and for other purposes.

DISASTER PAYMENTS. Federal aid provided to farmers for feed grains, wheat, rice, and upland cotton when either (1) planting is prevented or (2) crop yields are abnormally low because of adverse weather and related conditions.

DISK. A harrow or plow composed of circular plates arranged at an angle with the line of pull. Used to prepare soil for seeding. Also called disk plow, a plow composed of large circular plates. See HARROW.

DNA. Deoxyribonucleic acid, a compound of deoxyribose (a sugar), phosphoric acid, and four nitrogen bases: Adenine, cytosine, guanine, and thymine. Its molecule contains the genetic information for most living systems and consists of two strands in the shape of a double helix. A gene is a piece of DNA.

DOUBLE HELIX. A term often used to describe the DNA molecule, consisting of two spiraling strands of nucleotides joined crosswise by specific pairing of the bases.

DRYLAND FARMING. A system of producing crops in semiarid regions usually with less than 20 inches of annual rainfall without the use of irrigation. Frequently, part of the land will lie fallow in alternate years to conserve moisture.

ELECTRONIC BULLETIN BOARD. A collection in electronic form of messages, bulletins, and similar items such as one would find on a bulletin board; access, addition, and removal of items via computer.

EMBARGO. As typically referred to in relation to international agricultural trade, the suspension of shipments of one country's products to another for political or economic reasons.

ENZYMES. Substances produced by living cells that can bring about or speed up chemical reactions without undergoing change themselves. A protein that causes a cell's chemical reactions resulting in production of compounds necessary for the cell's survival.

EROSION. The loosening and movement of the solid material of the land surface by wind, moving water, ice, and landslides.

ETHANOL. An alcohol fuel that may be produced from an agricultural foodstock such as corn, sugarcane, or wood, and may be blended with gasoline to enhance octane, reduce automotive exhaust pollution, and reduce reliance on petroleum-based fuels.

FALLOW. Cropland left idle during the growing season. It is usually tilled to control weeds and conserve moisture in the soil.

FAMILY FARM. A farm where the operator and the operator's family make most of the day-to-day management decisions and supply the equity capital and a significant part of the labor needs.

FARM. Any place that has $1,000 or more gross sales of farm products in the course of a year.

FARM OPERATOR. A person who operates a farm, either by doing or supervising the work and by making the day-to-day operating decisions.

FEDERAL LAND BANK ASSOCIATIONS. Local farmer-owned organizations through which farmers obtain long-term (up to 40 years) loans on land. The associations are an integral part of the Farm Credit System, a lending group that supplies nearly one-third of the borrowed capital used by farmers and nearly two-thirds of the credit used by farmer cooperatives. The system's lending institutions include Federal land banks for loans on land, production credit associations for short-term and intermediate operating loans, and the banks for loans to cooperatives.

FEED GRAIN. Any of several grains commonly used for livestock or poultry feed, such as corn, sorghum, oats, and barley.

FERTILITY, SOIL. The quality that enables a soil to provide plant nutrients in the proper amounts and in the proper balance for the growth of specified plants when other factors such as light, temperature, and the physical condition of the soil are favorable.

FERTILIZER. Any material used to supply nutrients for plants.

FOOD, FARM-PRODUCED. Food products originating on U.S. farms. These include processed products made mainly from farm-produced ingredients, as well as eggs, fresh fruits, and vegetables, and other products sold to consumers without processing. Nonfarm foods are those not originating on farms, such as imported foods.

FOOD GRAIN. Cereal seeds most commonly used for human food, chiefly wheat and rice.

FORWARD CONTRACTING. A method of selling crops before harvest by which the buyer agrees to pay a specified price to the grower for a portion, or all, of his or her crops.

4-H YOUTH PROGRAMS. Organized groups of young people (ages 9 to 19), through which the Cooperative Extension Service, the U.S. Department of Agriculture, and State land-grant universities carry on educational work in farming and homemaking projects, career development, citizenship, leadership, and other youth development activities. The H's stand for head, hand, heart, and health. See COOPERATIVE EXTENSION SERVICE.

FUNGICIDE. Any substance used to kill fungi, which are forms of plant life, often undesirable, that lack chlorophyll and are unable to make their own food.

FUTURES CONTRACT. An agreement between two people, one who sells and agrees to deliver and one who buys and agrees to receive a certain kind, quality, and quantity of product to be delivered during a specified delivery month at a specified price.

GENETIC ENGINEERING. The definition in the Federal Register of June 26, 1986, on page 23370 dealing with agriculture follows: The genetic modification of organisms by recombinant DNA, recombinant RNA, or other specific molecular gene transfer or exchange techniques.

GREAT PLAINS. A level-to-gently sloping region of the United States that lies between the Rockies and approximately the 98th meridian, stretching from Canada to Mexico. The area is subject to recurring droughts and high winds. It consists of parts of the Dakotas, Montana, Nebraska, Wyoming, Kansas, Colorado, Oklahoma, Texas, and New Mexico.

GROSS FARM INCOME. Income that farm operators realize from farming. It includes cash receipts from the sale of farm products, Government payments, value of food and fuel produced and consumed on farms where grown, rental value of farm dwellings, and an allowance for change in the value of year-end inventories of crops and livestock.

HARROW. An implement set with spikes, springs, or disks used to pulverize and smooth soil. See DISK.

HARVESTED ACRES. Acres actually harvested for a particular crop, usually somewhat smaller at the national level than planted acres because of abandonment brought on by weather damage or other disasters or market prices too low to cover harvesting costs.

HERBICIDE. Any substance used to destroy or inhibit plant growth; mainly for killing weeds.

HOG-CORN PRICE RATIO. See CORN-HOG RATIO.

INCOME SUPPORT PAYMENT. See DEFICIENCY PAYMENTS.

INTEGRATED PEST MANAGEMENT. Uses an array of crop production strategies, combined with careful monitoring of insect pests or weed populations and other factors to achieve pest management. Some approaches used are selection of resistant varieties, timing of cultivation, biological control methods, and minimal use of chemical pesticides so that natural enemies of pests are not destroyed. See BIOLOGICAL CONTROL OF PESTS.

INTEGRATION. The combination (under the management of one firm) of two or more of the processes in the production and marketing of a particular product. The processes are generally capable of being operated as separate businesses.

Diversification, on the other hand, is the production of two or more farm products by one firm or farmer.

INTERNATIONAL COMMODITY AGREEMENT. An undertaking by a group of countries to exchange information on market conditions. Some agreements include substantive economic provisions aimed at stabilizing world prices, such as commitments on stocks and prices.

INTERNATIONAL TRADE BARRIERS. Regulations used by governments to restrict imports from other countries. Examples: Tariffs, embargoes, import quotas, and unnecessary sanitary restrictions.

LAND CAPABILITY. A measure of the suitability of land for use without damage. In the United States, it usually expresses the effect of physical land conditions, including climate, on the total suitability for agricultural use without damage. Arable soils are grouped according to their limitations for sustained production of the common cultivated crops without soil deterioration. Nonarable soils are grouped according to their limitations for the production of permanent vegetation and their risks of soil damage if mismanaged.

LAND-GRANT UNIVERSITIES. State colleges and universities started from Federal Government grants of land to each State to encourage further practical education in agriculture, homemaking, and the mechanical arts.

LAND-USE PLANNING. The decisionmaking process to determine the present and future uses of land. The resulting plan is the key element of a comprehensive plan describing the recommended location and intensity of development for public and private land uses such as residential, commercial, industrial, recreational, and agricultural. Implementing the plan is the applied phase.

LASER DISK. A device resembling a silver-colored phonograph record for storing digital or audio and video information, recorded and read by laser technology.

LEGUME. A family of plants, including many valuable food and forage species, such as peas, beans, soybeans, peanuts, clovers, alfalfas, sweetclovers, lespedezas, vetches, and kudzu. Legumes can convert nitrogen from the air to build up nitrogen in the soil. Many of the nonwoody species are used as a cover crop and are plowed under for improvement of the soil.

LIME, AGRICULTURAL. Materials usually composed of the oxide, hydroxide, or carbonate of calcium, or of calcium and magnesium. The most common forms used in agriculture are ground limestone, hydrated lime, burned lime, marl, and oyster shells.

LINTERS. The short fibers remaining on cottonseed after ginning. Too short for usual textile use, they are used for batting and mattress stuffing and as a source of cellulose.

LOAN RATE. The price per unit (bushel, bale, pound) at which the Government will provide loans to farmers to enable them to hold their crops for later sale.

LOW-INPUT FARMING. A term that may include organic farming, but some experts emphasize using, to the greatest extent possible, resources obtainable from the farm itself. Also see ORGANIC FARMING and ALTERNATIVE FARMING SYSTEMS.

MARKET BASKET OF FARM FOODS. Average quantities of U.S. farm foods purchased annually per household in a given period. Retail cost of these foods used as a basis for computing an index of retail prices for domestically produced farm foods. Excluded are fishery products, imported foods, and meals eaten away from home.

MARKETING ORDERS AND AGREEMENTS (FEDERAL). A means (authorized by, and based on, legislation) to permit agricultural producers to collectively influence the supply, demand, and/or price for a particular crop or commodity in order to improve the orderly marketing of the crop or commodity. Once approved by a required number, usually two-thirds, of producers of the regulated commodity, the marketing order is binding on all handlers of the commodity in the area of regulation. A marketing agreement may contain more diversified provisions, but it is enforceable with respect to those producers or handlers who voluntarily enter into the agreement with the Secretary of Agriculture.

MARKETING QUOTA. That quantity of a crop that will provide adequate and normal market supplies. This quantity is translated into terms of acreage needed to grow that amount and allotted among individual farms based on their previous production of that commodity. When marketing quotas are in effect (only after approval by two-thirds or more of the eligible producers voting in a referendum), growers who produce in excess of their farm acreage allotments are subject to marketing penalties on the 'excess' production and are ineligible for Government price-support loans. For certain tobaccos, a poundage limitation is applicable as well as acreage allotments when approved by grower referendum.

MARKETING RESEARCH. Research to provide the consumer with the highest quality agricultural products that are low cost and safe through new science and technology and to stimulate development, innovation, and testing of new concepts in marketing, transportation, processing, storage, and consumer services.

MARKETING SPREAD. The difference between the retail price of a product and the farm value of the ingredients in the product. This farm-retail spread includes the charges made by marketing firms for assembling, storing, processing, transporting, and distributing the products.

MARKETING YEAR. The year beginning at harvest time during which a crop moves to market. See CARRYOVER.

METROPOLITAN STATISTICAL AREA (MSA). A county or group of contiguous counties that contain at least one city of 50,000 inhabitants or more, or twin cities with a combined population of at least 50,000. In addition, contiguous counties are included in an MSA if, according to certain criteria, they are socially and economically integrated with the central city.

NATIONAL PROGRAM ACREAGE. The number of harvested acres of feed grains, wheat, cotton, and rice needed nationally to meet domestic and export use and to accomplish any desired increase or decrease in carryover levels. Program acreage for an individual farm is based on the producer's share of the national farm program acreage, except when an acreage reduction program has been announced.

NATIONAL FOREST. A Federal reservation dedicated to the protection and management of natural resources, under the concept of multiple use, for a variety of benefits including water, forage, wildlife habitat, wood, recreation, and minerals. National Forests are administered by the USDA Forest Service.

NATIONAL GRASSLAND. Land, mainly grass and shrub cover, administered by the Forest Service as part of the National Forest System for promotion of grassland agriculture, watersheds, grazing, wildlife, and recreation.

NATIONAL WOOL ACT. Legislation that provides price support for shorn wool at an incentive level to encourage production. The law also provides for a payment on sales of unshorn lambs and for mohair (hair from Angora goats).

NET FARM INCOME. The money and nonmoney income farm operators realize from farming as a return for labor, investment, and management after production expenses have been paid. Farm income is measured in two ways: Net farm income before inventory adjustment and net farm income after inventory adjustment. Net farm income before inventory adjustment does not include changes in the value of inventories such as crops and livestock at the end of the year.

NITROGEN. A chemical element essential to life and one of the primary plant nutrients. Animals get nitrogen from protein feeds, plants get it from soil, and some bacteria get it directly from air.

NONFARM INCOME. Includes all income from nonfarm sources (excludes money earned from working for other farmers) received by owner-operator families residing on a farm and by hired farm labor residing on a farm.

NONMONEY FARM INCOME. A statistical allowance used in farm income compilations to credit farmers with income for the value of farm products used on the farm (instead of being sold for cash) and the rental value of farm dwellings. It assumes farmers otherwise live rent-free on their farm business premises.

NONRECOURSE LOANS. Price-support loans to farmers to enable them to hold their crops for later sale. Farmers may redeem their loans by paying them off with interest. The loans are nonrecourse because if a farmer cannot profitably sell the commodity and repay the loan when it matures, the pledged or mortgaged collateral (the commodity on which the loan was advanced) can be delivered to the Government for settlement of the loan.

NORMAL CROP ACREAGE. The normal acreage on a farm devoted to a group of crops designated by the Secretary of Agriculture. When in effect, a farm's total planted acreage of such designated crops plus any set-aside cannot exceed the normal crop acreage if the farmer wants to participate in the program(s).

NORMAL YIELD. A term designating the average historic yield established for a particular farm or area. Can also describe average yields. Normal production would be the normal acreage planted to a commodity multiplied by the normal yield.

OFF-FARM INCOME. Off-farm income includes wages and salaries from working for other farmers, plus nonfarm income, for all owner-operator families, regardless of where they live.

OILSEED CROPS. Primarily soybeans, peanuts, cottonseed, sunflower seeds, and flaxseed used for the production of edible and/or inedible oils, as well as high-protein meals. Lesser oil crops are rape seed, safflower, castor beans, and sesame.

OILSEED MEAL. The product obtained by grinding the cakes, chips, or flakes that remain after most of the oil is removed from oilseeds. Oilseed meals are mainly used as a feedstuff for livestock and poultry. They are also used as a raw material in processing edible vegetable-protein products.

ONE-PERSON BALING. Use of field pickup hay balers, with self-tying attachments and bale ejectors, that allow one person to harvest hay crops.

OPTICAL DISK. A laser disk (see above) for storing digital information, including photos and moving pictures.

ORGANIC FARMING. The USDA Study Team on Organic Farming in July 1980 discussed the term in full in "Report and Recommendations on Organic Farming." It said there is no universally accepted definition. But it used the following: "Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotation, crop residues, animal manures, legumes, green manure, off-farm organic wastes, mechanical cultivation, mineral-bearing rocks, and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients, and to control insects, weeds, and other pests."

PARITY PRICE. A commodity price which expresses 1910-14 purchasing power of that commodity, based on its 10-year average price, the Parity Index, and a 10-year average of the Prices Received Index. The Parity Price for any commodity equals its 10-year average price multiplied by the ratio of the current Parity Index to the 10-year average of the Prices Received Index. The Parity Index reflects the prices paid by farmers for items of production and family living, including interest, taxes, and wage rates. Both the Parity Index and the Prices Received Index are expressed on a base of 1910-14 = 100. The Parity Index has exceeded 1.9 times the level of the 10-year average of the Prices Received Index since 1974. By this measure, nearly two of today's bushels are required to buy what one bushel bought in 1910-14. The nearly threefold gains in farm productivity are not reflected in Parity Prices. The definition enacted in 1948 permits calculation of Parity Prices for commodities (like soybeans) which were not widely grown in the 1910-14 base period for Parity.

PARITY RATIO. A measure of the relative purchasing power of farm products. The ratio between the index of prices received by farmers for all farm products and the index of prices paid by farmers for commodities and services used in farm production and family living. The parity ratio measures price relationships (prices received and prices paid). It does not measure farm income (units of production per acre and per animal have increased, and fewer farmers share total farm income). It does not measure the farmers' total purchasing power, because individual farms are larger, and total farm production is higher. It does not measure farmers' welfare to reflect off-farm income, Government payments, farmers' assets, and other factors.

PAYMENT LIMITATIONS. Limitations set by law on the amount of money any one person may receive in farm program payments each year under the feed grain, wheat, cotton, rice and other farm programs.

PESTICIDE. A substance used to kill a pest. Pesticides include insecticides, fungicides, herbicides, and nematicides.

PHOSPHATE. A term commonly used to indicate a fertilizer that supplies phosphorus. A major element in fertilizers.

POTASH. A term commonly used to indicate a fertilizer that supplies potassium, an essential nutrient for plant growth. A major element in chemical fertilizers.

PRICE INDEX. An indicator of the average price change for a group of commodities that compares prices for the same commodities in some other period, commonly called the base period. Monthly price indexes computed by the U.S. Department of Agriculture are the Index of Prices Received by Farmers and the Index of Prices Paid by Farmers for Commodities and Services, Interest, Taxes, and Farm Wage Rates, referred to as the Parity Index when expressed in the 1910-14 = 100 base.

PRICE SUPPORT LEVEL. The price for a unit of a farm commodity (bushel, pound) that the Government will support through price-support loans, purchases, and/or payments. Price support levels are determined by law and are set by the Secretary of Agriculture.

PRICES-PAID INDEX. An indicator of changes in the prices farmers pay for goods and services (including interest, taxes, and farm wage rates) used for producing farm products and those needed for farm family living. Referred to as the Parity Index when computed on a 1910-14=100 base. Also computes on a 1967 = 100 base.

PRICES-RECEIVED INDEX. A measure computed on the basis of prices farmers received, usually at the farm or in small local markets.

PRODUCTION CREDIT ASSOCIATIONS. Lending groups, owned by their farmer-borrowers, that provide short- and intermediate-term loans for up to 10 years from funds obtained from investors in the money markets. The associations are an integral part of the Farm Credit System.

PRODUCTION EXPENSES. Total cash outlays for production. Capital expenses are figured on annual depreciation rather than on yearly cash outlays for capital items.

PRODUCTIVE CAPACITY. The amount that could be produced within the next season if all the resources currently available were fully employed using the best available technology. Productive capacity will increase whenever the available resources increase or the production of those resources increases. The term describes the possibilities at one point in time but is not fixed for all time. As real prices and profitability rise, the resources committed to agriculture and the adoption of new technology also rise.

PRODUCTIVITY. The relationship between the quantity of inputs (land, labor, tractors, feed, etc.) employed and the quantity of outputs produced. An increase in productivity means that more outputs can be produced from the same inputs or that the same outputs are produced with fewer inputs. Both single-factor and multifactor indexes are used to measure productivity. Single-factor measures examine the output per unit of one input at the same time other inputs may be changing. Multifactor productivity indexes consider all productive resources as a whole, netting out the effects of substitution among inputs. Crop yield per acre, output per workhour, and livestock production per breeding animal are all single-factor productivity indicators. The Total Farm Output per Unit of Input Index is a multifactor measure.

PUBLIC LAW 480. A law passed by the Congress in 1954, often referred to as "P.L. 480" or the "Food for Peace" program. Primary purposes are to expand foreign markets for U.S. agricultural products and to use U.S. agricultural abundance to combat hunger and encourage economic development in the developing countries. The program makes U.S. agricultural commodities available at low-interest, long-term credit under title I of the law, and as donations for famine or other emergency relief under title II. Under title I, the recipient country agrees to undertake agricultural development projects to improve its own food production or distribution.

PULPWOOD. Wood used in the manufacture of paper, fiberboard, and so on.

RANCH. An expression used mostly in the Western United States to describe a tract of land, including land and facilities, used for the production of livestock. Accepted western usage generally refers to the headquarters facilities, pastures, and other land as the ranch, as distinguished from range. Loosely defined, a ranch may also be a small western farm, such as a fruit ranch or a chicken ranch.

RECOMBINANT DNA (rDNA). The DNA formed by combining segments of DNA from different types of organisms.

RECOMBINANT DNA (rDNA) TECHNOLOGY. The technique of isolating DNA molecules and inserting them into the DNA of a cell—"recombining DNA." Also called genetic engineering.

RENEWABLE NATURAL RESOURCES. Resources such as forests, rangeland, soil, and water that can be restored and improved to produce the food, fiber, and other things humans need on a sustained basis.

RESOURCES. The available means for production. Land, labor, and capital are the basic means of production on farms.

RHIZOBIA. A class of bacteria that live in symbiosis with plant roots and fix nitrogen.

RIBONUCLEIC ACID (RNA). A molecule similar to DNA that functions primarily to decode the instructions for protein synthesis that are carried by genes.

ROTATION, CROP. The growing of different crops in recurring succession on the same land.

ROUGHAGE. Feed, such as hay and silage, with high fiber content and low total digestible nutrients.

SECTION 32. A section of Public Law 320 (approved August 24, 1935) that authorizes use of customs receipts funds to encourage increased consumption of agricultural commodities by means of purchase, export, and diversion programs.

SET-ASIDE. A Government farm program term used to describe the acreage a farmer must devote to soil-conserving uses (such as grasses, legumes, and small grain that is not allowed to mature) in order to be eligible for production adjustment payments and price-support loans and purchases.

SHARECROPPER. A tenant who shares crops, livestock, or livestock products with the landowner, who, in turn, often extends credit to and closely supervises the tenant. The sharecropper generally supplies only labor.

SILAGE. A crop that has been preserved in moist, succulent condition by partial fermentation in a tight container (silo) above or below the ground. The chief crops stored in this way are corn, sorghum, and various legumes and grasses. The main use of silage is in cattle feeding.

SOIL. A dynamic natural body on the surface of the earth composed of mineral and organic materials and living forms in which plants grow. In the United States, about 70,000 kinds of soil are recognized in the nationwide system of classification. Each has a unique set of characteristics and a unique potential for use.

STANDARD METROPOLITAN STATISTICAL AREA (SMSA). See Metropolitan Statistical Area.

STARCH. A complex carbohydrate found in most plant seeds, bulbs, and tubers.

STRIPCROPPING. Growing crops in a systematic arrangement of strips or bands to serve as vegetative barriers to wind and water erosion. See CONTOUR FARMING.

STUBBLE MULCH. A protective cover provided by leaving plant residues of any previous crop as a mulch on the soil surface when preparing for the following crop.

SUBSISTENCE FARM. A low-income farm where the emphasis is on production for use of the operator and the operator's family rather than for sale.

SUPPLEMENTARY IMPORTS. Farm products shipped into this country that add to the output of U.S. agriculture. Examples: Cattle, meat, fruit, vegetables, and tobacco. See COMPLEMENTARY IMPORTS.

SYNTHETICS. Artificially produced products that may be similar to natural products.

TALL OIL. A byproduct from the manufacture of chemical wood pulp. Used in making soaps and for various industrial products.

TARGET PRICES. A minimum level of prices determined by law to provide an economic safety net. Sometimes called the guaranteed price level. The target price, based on costs of production, becomes the level at which the Government will bolster farm income by making payments to qualifying farmers when national average market prices fall below the target. See DEFICIENCY PAYMENTS.

TECHNOLOGY. Applied science.

TISSUE CULTURE. The technique of growing a whole plant from a single engineered cell or piece of plant tissue.

TRACE ELEMENT. A chemical substance used in minute amounts by organisms and held essential to their physiology (magnesium, iron, copper, etc.).

UNIT COST. The average amount it takes in dollars to produce a single item. The total cost divided by the number of items produced.

UPLAND COTTON. A fiber plant developed in the United States from stock native to Mexico and Central America. Includes all cotton grown in the continental United States except Sea Island and American Pima cotton. Staple length of upland cotton ranges from 3/4 inch to 1-1/4 inches.

URBAN AND BUILT-UP AREAS. Cities, villages, and other areas of more than 10 acres used as industrial sites, railroad yards, cemeteries, airports, golf courses, shooting ranges, institutional and public administration sites, and similar areas.

VECTOR. The messenger that carries new genes into cells. Plasmids are currently the preferred vectors, but viruses may also be used as vectors. Vectors may carry diseases, like yellow-fever mosquitos.

VIDEODISK. A laser disk for storage of audio and video information, including photos and moving pictures.

WATERSHED. The total land area, regardless of size, above a given point on a waterway that contributes runoff water to the flow at that point. A major subdivision of a drainage basin. On the basis of this concept, the United States is generally divided into 18 major drainage areas and 160 principal river drainage basins containing some 12,700 smaller watersheds.

WATERWAY. A natural or artificially constructed course for the concentrated flow of water.

WHOLESALE PRICE INDEX. Measure of average changes in prices of commodities sold in primary U.S. markets. "Wholesale" refers to sales in large quantities by producers, not to prices received by wholesalers, jobbers, or distributors. In agriculture, it is the average price received by farmers for their farm commodities at the first point of sale when the commodity leaves the farm.

YIELD, ECONOMIC MAXIMUM. The most that can be produced on full efficient application of technology presently known by all farmers. Assumes there are no limitations on management, materials, equipment, capital, and experience.

APPENDIX IV.

SELECTED REFERENCES

Order the following reports from the sources listed under each reference heading. For those specified to be available from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, DC 20402, make payment by money order or personal check; GPO also now accepts Master Card, Choice, and Visa credit cards on mail orders and at all of its bookstores, and on phone orders placed by dialing area code (202) 783-3238. Currency is sent at sender's risk. Foreign currency and postage stamps are not acceptable. Remittances from foreign countries should be made by international money order, or a draft on a U.S. or Canadian bank, payable to Superintendent of Documents. UNESCO coupons are also acceptable from foreign countries.

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AGRICULTURAL STATISTICS BOARD REPORTS

The Agricultural Statistics Board of USDA's National Agricultural Statistics Service (NASS) estimates production, stocks, inventories, disposition, utilization, and prices of agricultural commodities. Publications issued by the Agricultural Statistics Board and its 44 State Statistical Offices are for sale. Information about ordering publications is available from the Agricultural Statistics Board, USDA, Room 5829-S, Washington, DC 20250, phone (202) 447-4021.

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RESEARCH REPORTS

All periodicals from the Economic Research Service (ERS) are available on a paid subscription basis. Multiyear subscriptions are available at a discount. For an order form or additional details, contact: Economic Research Service, Box 1608, Rockville, MD 20850, phone (301) 953-2515. Make checks or money orders payable to USDA/ERS. Visa and Master Cards are accepted. Add 25 percent for shipments to foreign addresses.

AGRICULTURAL OUTLOOK report pools USDA's latest analyses of commodity supplies and demand, world agricultural trade, food marketing, farm inputs, agricultural policy, transportation and storage, and related developments, and provides USDA's official estimates of farm income and food prices. Special articles range from international trade policies to U.S. land use and availability. It is published 11 times a year and averages 52 pages, including 6 pages of charts and 20 pages of statistical tables. Subscription price is $22, 1 year; $43, 2 years; $63, 3 years.

FARMLINE, published 11 times a year, provides broad coverage of major ERS research and analysis, with emphasis on how current agricultural economic developments affect U.S. farmers, business people, and consumers. Directed at a general audience, FARMLINE illuminates data and complex trends with striking charts that drive home key points. Subscription price is $11, 1 year; $21, 2 years; $30, 3 years.

NATIONAL FOOD REVIEW, published quarterly, covers developments, issues, and programs relating to food economics. Objective, indepth articles detailing the latest ERS information are prepared for economists, nutritionists, educators, consumer advisors, food industry representatives, and others who need to keep posted on current developments in food economics. Subscription price is $10, 1 year; $19, 2 years; $27, 3 years.

ECONOMIC INDICATORS OF THE FARM SECTOR series contains five reports that explore the economic status of U.S. farms and farm operator income and expenses. National and State Financial Data summarizes farming's financial status. Production and Efficiency Statistics is keyed to changes in production, management, and labor practices. Farm Sector Review analyzes all economic accounts and marketing data for food and fiber. Costs of Production presents final average cost estimates for major agricultural commodities. Subscription price is $12, 1 year; $23, 2 years; $33, 3 years.

RURAL DEVELOPMENT PERSPECTIVES, published three times a year (October, February, and June), bridges the gap between rural theory and practice. It presents the latest research results and ideas in a crisp nontechnical manner so rural practitioners can put them to work. Each issue contains 8 to 10 articles (mostly no more than 4 pages long), liberally illustrated with charts and photos, 40-48 pages per issue. Subscription price is $9, 1 year; $17, 2 years; $24, 3 years.

FOREIGN AGRICULTURAL TRADE OF THE UNITED STATES is a bimonthly statistical report on farm exports and imports. Each issue of about 124 pages contains short feature articles that highlight current developments in farm trade, international prices, food aid, and similar topics. Subscribers also receive two annual supplements containing trade data for the fiscal year and calendar year. Subscription price is $20, 1 year; $39, 2 years; $57, 3 years.

THE JOURNAL OF AGRICULTURAL ECONOMICS RESEARCH, a quarterly containing technical articles on agricultural economics, including econometric models and statistics, focusing on methods employed and results of USDA economic research. Each issue carries book reviews. Subscription price is $7, 1 year; $13, 2 years; $18, 3 years.

SITUATION AND OUTLOOK reports analyze supply, demand, use, trade, and prices of major crops, livestock, and dairy and poultry products in text, tables, and charts. Reports average 40 pages per issue.

Title	**Subscription Fee**	
	Domestic	**Foreign**
Agricultural Exports (4 issues)	$5.00	$6.25
Agricultural Resources (4)	7.00	8.75
Cotton & Wool (3)	5.50	6.90
Dairy (5)	6.00	7.50
Feed (3)	5.50	6.90
Fruit (4)	7.50	9.40
Livestock & Poultry (4)	8.50	10.65
Oil Crops (3)	5.00	6.25
Rice (2)	5.00	6.25
Sugar & Sweetener (3)	5.50	6.90
Tobacco (4)	7.50	9.40
Vegetable (3)	5.00	6.25
Wheat (3)	5.00	6.25
World Agriculture (4)	7.00	8.75

Other reports available:

The quarterly REPORTS catalogue provides descriptions and prices of all current ERS publications, including monographs. To be placed on the free mailing list, write to EMS Information, Room 237, 1301 New York Ave., NW, USDA, Washington, DC 20005-4788.

WEEKLY WEATHER AND CROP BULLETIN, published by USDA and the U.S. Department of Commerce. Summarizes weather and its effects on crops for the preceding week. Condensed summaries give both weather and farm progress for all States. Subscription price is $35, domestic per year and $50, foreign. Make check payable to Department of Commerce, NOAA. Order Weekly Weather and Crop Bulletin, Room 5844-South Bldg., USDA, Washington, DC 20250.

NUTRITION INFORMATION SERVICE REPORTS

The following reports on food composition and food consumption are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

COMPOSITION OF FOODS... Raw, Processed, Prepared, Agriculture Handbook No. 8 (AH-8) costs $7. Its revised sections are: DAIRY AND EGG PRODUCTS (AH 8-1) $9; SPICES AND HERBS (AH 8-2) $3.75; BABY FOODS (AH 8-3) $12; FATS AND OILS (AH 8-4) $7.50; POULTRY PRODUCTS (AH 8-5) $17; SOUPS, SAUCES, AND GRAVIES (AH 8-6) $12; SAUSAGES AND LUNCHEON MEATS (AH 8-7) $6; BREAKFAST CEREALS (AH 8-8) $9; FRUITS AND FRUIT JUICES (AH 8-9) $14; PORK PRODUCTS (AH 8-10) $11; VEGETABLES AND VEGETABLE PRODUCTS (AH 8-11) $16; NUT AND SEED PRODUCTS (AH 8-12) $7.50; BEEF PRODUCTS (AH 8-13) $19; BEVERAGES (AH 8-14) $9.50; FINFISH AND SHELLFISH PRODUCTS (AH-8-15) $11.

The CONTINUING SURVEY OF FOOD INTAKES BY INDIVIDUALS gives up-to-date information on daily food intakes for 1985 and 1986 and compares new data with information from 1977. Report No. 85-1 ($4.25) gives information for a sample of WOMEN 19-50 YEARS AND THEIR CHILDREN 1-5 YEARS, 1 DAY, 1985; Report No. 85-2 ($9.50) gives information for a sample of LOW-INCOME WOMEN 19-50 YEARS AND THEIR CHILDREN 1-5 YEARS, 1 DAY, 1985; Report No. 85-3 ($4.75) provides information for a sample of MEN 19-50 YEARS, 1 DAY, 1985; Report No. 86-1 ($18.95) provides informaton on WOMEN 19-50 YEARS AND THEIR CHILDREN 1-5 YEARS , 1 DAY, 1986; Report No. 85.4 ($8) provides information on WOMEN 19-50 YEARS AND THEIR CHILDREN 1-5 YEARS, 4 DAYS, 1985; Report No. 85-5 ($11) provides information on LOW-INCOME WOMEN 19-50 YEARS AND THEIR CHILDREN 1-5 YEARS, 4 DAYS, 1985; Report No. 86-2 ($8) provides information on LOW-INCOME WOMEN 19-50 YEARS AND THEIR CHILDREN, 1-5 YEARS, 1 DAY, 1986; Report No. 86-3 ($9.50) provides information on WOMEN 19-50 YEARS AND THEIR CHILDREN 1-5 YEARS, 4 DAYS, 1986; Report No. 86-4 ($12) provides information on LOW-INCOME WOMEN 19-50 YEARS AND THEIR CHILDREN 1-5 YEARS, 4 DAYS, 1986.

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The following nutrition publications have been developed for the general public and are for sale by the Superintendent of

Documents, U.S. Government Printing Office, Washington, DC 20402:

DIETARY GUIDELINES AND YOUR DIET (HG-232-1-7) is a set of seven bulletins that show how to apply the Dietary Guidelines to everyday diets; the set costs $4.50.

COOKING FOR PEOPLE WITH FOOD ALLERGIES (HG-246) gives advice and recipes for people who are allergic to several major food ingredients; it costs $1.50.

THRIFTY MEALS FOR TWO: MAKING FOOD DOLLARS COUNT (HG-244) gives advice on purchasing, planning, and preparing meals for the two-person household; cost is $2.50.

YOUR MONEY'S WORTH IN FOOD (HG-183) shows how to buy food economically; it costs $2.25.

NUTRITIVE VALUE OF FOODS (HG-72) provides values for 18 nutrients in commonly used household measures of more than 900 foods; it costs $2.75.

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OTHER FOOD REPORTS

FOOD AND NUTRITION, published by the Food and Nutrition Service (FNS) reports on the Federal food assistance programs administered by FNS in cooperation with State and local agencies. The programs include the Food Stamp Program; the Food Distribution Program; the National School Lunch Program and School Breakfast Program; the Child Care Food Program; the Summer Food Service Program for Children; the Special Supplemental Food Program for Women, Infants, and Children; and the Commodity Supplemental Food Program. Free distribution is limited. However, subscriptions can be purchased from the U.S. Government Printing Office. Yearly subscriptions are $5, domestic; $6.25, foreign. Single copies are $1.25, domestic; $1.56, foreign. Send check or money order to Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FOOD NEWS FOR CONSUMERS is published by the Food Safety and Inspection Service (FSIS), and is available by subscription only, $5, domestic; $6.25, foreign. Order from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

NONPUBLISHED FOOD REPORT

USDA's TOLL-FREE MEAT AND POULTRY HOTLINE
1-800-535-4555

Consumers with questions on the safe handling, preparation, and storage of meat and poultry products are encouraged to contact USDA's Toll-free Meat and Poultry Hotline. Staffed by specially trained home economists. the Hotline is in operation from 10 a.m. to 4 p.m., Eastern Standard Time.

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OTHER REPORTS

SOIL AND WATER CONSERVATION NEWS is published monthly by the Soil Conservation Service (SCS). It presents articles, in nontechnical language, about national, State, and local programs for conserving and developing land and water resources, and improving environmental quality. Domestic annual subscription, $11; $13.75, foreign. Single copies $1, domestic; $1.25, foreign. Send subscription orders to Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Free distribution is limited to cooperators of the Department engaged in conservation activities, agricultural colleges and libraries, experiment stations, and similar institutions. Write to SCS, USDA, P.O. Box 2890, Washington, DC 20013-2890.

FOREIGN AGRICULTURAL TRADE REPORTS

Foreign Agricultural Service (FAS) COMMODITY CIRCULARS are periodic reports on world production and trade of major commodities, including grain and feed, cotton, oilseeds and products, livestock and meat, dairy and poultry, horticultural products, seeds, coffee, sugar, tea, tobacco, and wood products. Send requests for price list to Information Division, Program and Policy Branch, Room 4644-S, Foreign Agricultural Service, U.S. Department of Agriculture, Washington, DC 20250-1000.

AGEXPORTER is a monthly magazine for business firms selling U.S. farm products overseas. It includes current and background information useful to export marketing, including programs to expand U.S. agricultural exports. Yearly subscription prices are $11, domestic, and $14, foreign. Send a check for the total amount payable to the Foreign Agricultural Service. Only checks on U.S. banks, cashier's checks, or money orders will be accepted. Mail to: Foreign Agricultural Service, Room 4642-S, U.S. Department of Agriculture, Washington, DC 20250-1000.

INTERNATIONAL MARKETING PROFILES present detailed statistical information on agricultural trade activity by country or commodity. Information is included on market trends, export performance, and lists of foreign buyers. There is a charge for these reports. For an order blank and price information, contact Agricultural Information and Marketing Services, Room 4649-S, Foreign Agricultural Service, USDA, Washington, DC 20250-1000.

WORLD PRODUCTION AND TRADE is a weekly summary of significant developments in world agricultural production and trade, emphasizing commodity developments of importance to U.S. agriculture and a weekly table of Rotterdam prices and levies. Available free to U.S. residents only. Send requests to Information Division, Room 5920-S, Media and Public Affairs Branch, Foreign Agricultural Service, USDA, Washington, DC 20250-1000.

WORLD CROP PRODUCTION is a monthly report of USDA's production estimates for wheat, rice, coarse grains, oilseeds, and cotton in major countries and selected regions of the world. Subscription fee is $18 domestic and $25 foreign. Send request to Information Division, Program and Policy Branch, Foreign Agricultural Service, USDA, Washington, DC 20250-1000.

DICTIONARY OF INTERNATIONAL AGRICULTURAL TRADE (AH No. 411) is a practical, up-to-date reference for those involved in international trade of agricutural products. The dictionary includes brief descriptions of a wide variety of subject areas, including agricultural commodities, policy, finance, documentation, transportation, and storage. A limited number of copies of this report are available from the Foreign Agricultural Service, Information Division, Media and Public Affairs Branch, USDA, Washington, DC 20250-1000.

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AGRICULTURAL MARKETING SERVICE REPORTS

AMS FOOD PURCHASES is issued weekly at an annual subscription rate of $72.00. The report summarizes all purchases and requests for those commodities purchased by the Agricultural Marketing Service (AMS) for use in school lunch and other domestic feeding programs. Information includes names of contract awardees, shipping points and destinations, quantities purchased, costs, award ranges, and shipping periods for each product. The reports for the various commodities are all published by and available from the Fruit and Vegetable Market News Service, AMS, USDA, Room 2503-S, P.O.Box 96456, Washington, DC 20090-6456. Telephone: (202) 447-2175.

MARKET NEWS REPORTS cover current prices, supply, demand, and trends for various commodities produced and marketed in different geographical locations. They are available by mail on a paid subscription basis from the respective commodity divisions of the AMS. Subscription prices are subject to change without notice. For more information, contact the Information Staff, AMS, USDA, Room 3510-S, P.O.Box 96456, Washington, DC 20090-6456.

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ANNUAL SUMMARIES

AGRICULTURAL STATISTICS, produced by the National Agricultural Statistics Service, USDA, can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. A comprehensive statistical report containing current and historical data. Revised annually.

COMMODITY CREDIT CORPORATION CHARTS, limited quantities available; free upon request. Includes graphic and tabular summary of financial and program data. Send request to Information Division, Agricultural Stabilization and Conservation Service, USDA, P.O. Box 2415, Washington, DC 20013.

REPORT OF THE PRESIDENT OF THE COMMODITY CREDIT CORPORATION, free distribution to Members of Congress, with limited additional copies available. A statutory report covering operations and financial condition of the Commodity Credit Corporation for the preceding fiscal year. Send request to Information Division, Agricultural Stabilization and Conservation Service, USDA, P.O. Box 2415, Washington, DC 20250.

U.S. TIMBER PRODUCTION, TRADE, CONSUMPTION, AND PRICE STATISTICS, 1950-85. An annual report that presents statistical information on the production, trade, consumption, and price of timber products in the United States. Copies are available from the Forest Service, USDA, Washington, DC 20250.

PERIODICALS

AGRICULTURAL RESEARCH, published 10 times a year by the Agricultural Research Service, USDA, reports results of research conducted by ARS scientists. Send requests for subscription information to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

EXTENSION REVIEW, published quarterly by the Extension Service, USDA. Describes Extension program activities at Federal, State, and county levels. Send subscription orders to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Yearly subscription, $10, domestic; $12.50, foreign. Send single issue requests to ES Publications and Inquiries, Rm. 3431-S South Bldg., USDA, Washington, DC 20250.

FARMER COOPERATIVES, published monthly by the Agricultural Cooperative Service (ACS), USDA, P.O. Box 96576, Washington, DC 20090-6576. One copy is issued free to each farmer cooperative; otherwise, yearly subscriptions, $9, domestic; $11.25, foreign, upon request to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Carries feature articles about ACS technical assistance and research projects, discusses current cooperative issues, and reports significant actions of farmer cooperatives across the Nation.

FGIS UPDATE, free. Issued every other month. Provides timely summary of important activities of the Federal Grain Inspection Service (FGIS) to all who have an active interest in the grain industry. Send requests to be added to the mailing list to Information Specialist, FGIS, USDA, Washington, DC 20250.

FOOD NEWS FOR CONSUMERS, published by the Food Safety and Inspection Service (FSIS), and available by subscription only, $5, domestic; $6.25, foreign. Order from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

SOIL AND WATER CONSERVATION NEWS, published monthly by the Soil Conservation Service (SCS). Presents articles, in nontechnical language, about national, State, and local programs for conserving and developing land and water resources, and improving environmental quality. Domestic annual subscription, $18; $22.50, foreign. Single copies $2.50, domestic; $3.15, foreign. Send subscription orders to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Free distribution is limited to cooperators of the Department engaged in conservation activities, agricultural colleges and libraries, experiment stations, and similar institutions. Write to SCS, USDA, P.O. Box 2890, Washington, D.C. 20013.

EXPORT HANDBOOK FOR U.S. AGRICULTURAL PRODUCTS (No. 593, revised March 1985) provides the shipper of U.S. agricultural products with brief and well-defined guidelines that include general shipping information, product selection, packaging, storage, handling, loading, and transport. Product disorders that exporters and foreign receivers of U.S. farm products should be aware of are also covered. Order at no charge from USDA's Office of Transportation, P.O. Box 96575, Washington, DC 20090-6575. (Telephone: 202-653-6275.)

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AGRICULTURAL MARKETING SERVICE REPORTS

AMS FOOD PURCHASES, free. Issued weekly and quarterly. The weekly report summarizes all purchases and requests for offers for those commodities purchased by the Agricultural Marketing Service (AMS) for use in child nutrition, school lunch, and other domestic feeding programs. Information includes names of contract awardees, shipping points and destinations, quantities purchased, costs, award ranges, and shipping periods for each product. The quarterly report covers the total quantity and expenditures for each commodity purchased during the preceding quarters of the fiscal year. The reports are published by the Office of the Deputy Administrator, Commodity Services, Room 3064-S, AMS, USDA, Washington, D.C. 20250. Telephone: (202) 447-5231.

MARKET NEWS REPORTS cover current prices, supply, demand, and trends for various commodities produced and marketed in different geographical locations. They are available by mail or on a paid subscription basis from the respective commodity divisions of the AMS. Subscription prices are subject to change without notice. The reports are also available annually. For more information, contact Information Staff, AMS, USDA, Washington, D.C. 20250. Telephone: (202) 447-8998. Please state the commodities that interest you.

APPENDIX V.

USDA'S COMPUTERIZED INFORMATION SERVICES*

The U.S. Department of Agriculture offers two computerized services to speed much of its information to the public.

One is the 'EDI Service,' designed for use by private news and information services that rewrite or otherwise enhance the information and sell it to their own clients. EDI offers only current information, or news, at speeds up to 9600 baud and in bulk. Reports from many USDA agencies are available by computer within minutes of their scheduled release times anywhere in the country and throughout the world.

"USDA Online," USDA's other service, is designed for newspapers, broadcast stations, and businesses. USDA Online offers a wide selection of the reports available through EDI. Reports are broken down so users can select smaller parts.

Reports from EDI vary in length from a few sentences to 100 or more pages. EDI offers about 500 different categories of reports including press releases; crop, livestock, outlook and situation reports; trade leads; highlights of research data from USDA's 250 laboratories; soil and water conservation information; attache reports; analyses of commodity reports from extension offices in 16 States; reports from fruit and vegetable, livestock, cotton, poultry, and other markets; boat and rail arrivals; a calendar of agricultural events; a daily 2-page summary of top news stories about USDA and agriculture in general; and this Fact Book.

The EDI Service also offers research information on human and animal nutrition, plants, soil, water, and new products.

EDI provides five methods of capturing information: (1) Use of a dedicated line which allows the EDI computer to send the user's computer what the user wants as soon as USDA releases it, (2) automatic retrieval through an order list developed by the user, (3) automatic retrieval by report title, (4) selected retrieval of releases on the user's list, (5) and selected retrieval by menu browsing.

USDA agencies loading into EDI are the Agricultural Marketing Service, Agricultural Research Service, Agricultural Stabilization and Conservation Service, Cooperative State Research Service, Economic Research Service, Extension Service, Foreign Agricultural Service, National Agricultural Statistics Service (including 44 of its State offices), Soil

Conservation Service, Office of Information, Office of Transportation, and the World Agricultural Outlook Board.

EDI rates to the public are $75 monthly minimum, $12 per hour for connect time, and $0.95 for each 100 lines of information taken. The service is generally accessible by a local telephone call. Some communications charges are involved.

USDA Online (as well as EDI) offers many of the reports mentioned above, including databases on food and nutrition, agricultural trade, animal health, agricultural facts (including facts from this publication), a calendar of agricultural events and speaking engagements of USDA's top officials and an exhibits schedule, regional news releases and a listing giving names and telephone numbers of people at USDA to call for various information.

* For more information on these USDA computer information services, call (202) 447-5505, or write to Special Programs Division, Office of Information, Room 536-A, Washington, DC 20250.

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